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VOL. XXI. NO. 3

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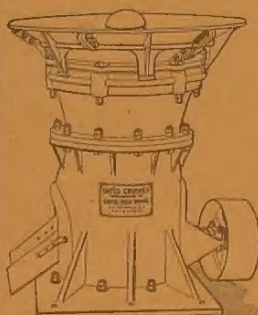
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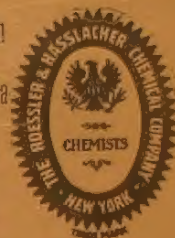
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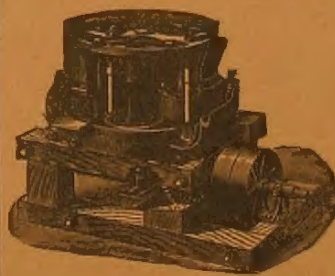
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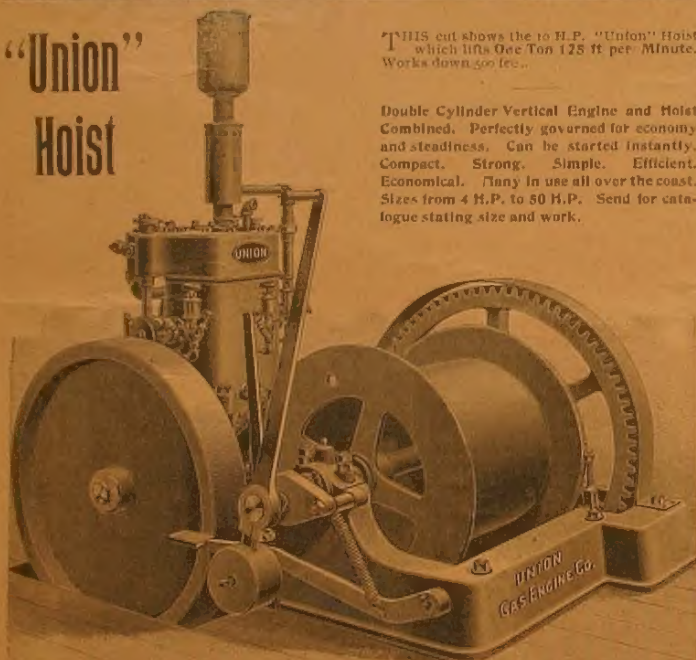
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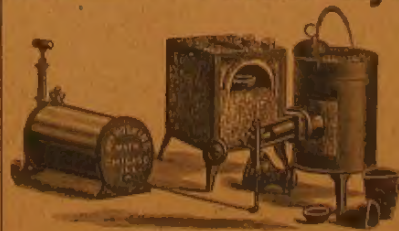
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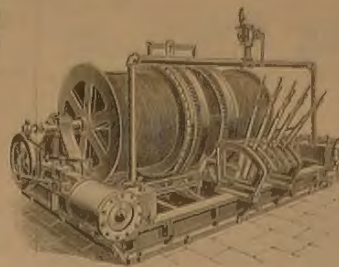
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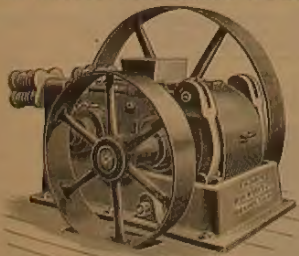
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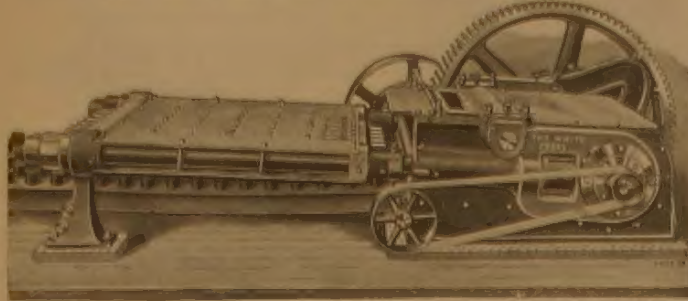
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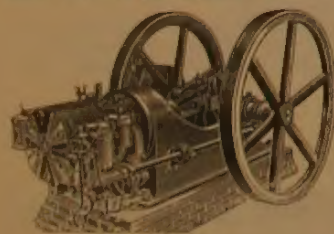
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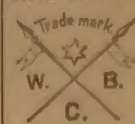
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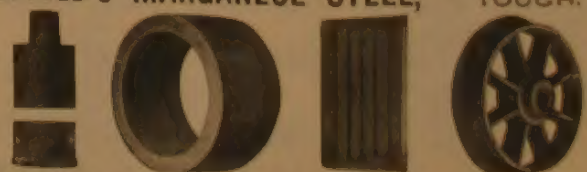
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The formation of a Southern California Branch of this association, which has proved its usefulness in the past seven years of its short but eventful career, is a subject which the southern mining counties are deeply interested in. The recent rapid strides of development in the industry in many parts of almost all southern counties has given to mining in those sections a commercial standing and importance, which its industrial activity merits.

These mining interests have now gained such an extent and increase that numerous towns have made their appearance on the once dry and waterless desert. New social problems as the supply of water for domestic and milling purposes, better means of travel by roads and railways and the obtaining of municipal, state and federal aid to accomplish these necessary improvements all require wider aid, more united action than can be accomplished by individual effort, no matter how well the separate interests of each individual or mine is pushed, for the combined efforts of the whole of the best minds connected with the industry as a society will accomplish much more than the separate endeavors of each individual or company when not so united.

When union can accomplish more good even on a small scale, so it can also work greater benefit and have a larger field or scope of operation, when that union is made a State Association. The larger the association the greater influence it has, as it is not a district or sectional affair, but represents the combined influence of the whole mining interests of the state. The approaching events of the Paris Exposition of 1900, and the meeting of the American Institute of Mining Engineers in San Francisco in October render it incumbent on the mine owners of the southern counties to have their interests well represented.

ed at both these important occasions. A separate or sectional association formed for the southern part of the state alone would not have the influence and importance and would not attain the same results that it can accomplish by becoming the Southern California Branch of the State Miners' Association is the opinion of the large majority of the oldest and most influential mine owners of this district, hence the present move to gain the benefit to be derived from past experience and union of all the miners of the State for mutual aid and benefit.

PIONEER WORK IN MINING.

Those who are not acquainted with the difficulties and expense attending the operation of prospecting and opening a mine in a new district, too often only take into account the amount of actual mining work done, and cannot appreciate the amount of preliminary or pioneer work which had to be accomplished before mining commenced.

Very often the pioneer work, in the matter of opening roads or trails, has to be done for a long distance off the claim or claims, and does not consequently count when estimating annual assessment work. There are many camps or districts where much road work has to be done by the claim owner each year and receive for doing so no credit or allowance from the county supervisors. In the northern states, the lumberman shares this pioneer work with the miner in many instances, but in the desert and mountain sections of the southwest, the venturesome prospector has to play a lone hand, and open the path to industry and wealth, for which work he seldom gets any credit. Unfortunately, the pioneer does not always receive the just reward of his industry, and is not appreciated to the extent his labors entitle him to receive.

The opening of trails and new roads in mountain sections ought to be a part of the county municipal work, as it is the whole community who in the end get the benefit from the increased trade given for each new mine discovered and worked.

As a means of preserving the forest reserves from fire, mountain trails are the first necessity to gain access to the part of the reserve which is threatened with destruction. Trails in the mountains are as necessary to the development of the country as good roads are in the settled portions of the country. There is consequently the double object in view in advocating their construction, for, to leave such pioneer work to be done by the prospector and miner alone is to impose a hardship on those operating in that county, and causes many to direct their efforts to districts more remote, but having better trails and roads, although much further off.

PHOTOGRAPHY IN MINING.

As a means of attracting attention to a district or mine, good photographs to illustrate descriptive matter form an object lesson of the highest value, both for underground and surface operations or views. As the season for travel and active operations is at hand, we recommend to our readers this handy and interesting means of advertising their mine or district, and will take pains to produce such views in the JOURNAL. As a means of recording mining development and the history of the country, photographs are pen pictures written by Nature herself with only a little chemical and care on the part of the operator.

which gives pleasure in referring to them on future occasions, and have good value as an investment of time and money. As a means of illustrating the position and environment of a property, they have no equal, and the cost is at the present time but a small matter when the benefits to be received are taken into consideration. The work of developing the views taken need not be done by the party taking them, as that operation can be obtained at the store or establishment where such photographic supplies are sold, and consequently saves much time and trouble to the amateur who takes the pictures.

A RESOLUTION was passed by the Mining and Metallurgical Section of the Franklin Institute of Philadelphia, favoring an appropriation by Congress in support of a Mining and Metallurgical Bureau, in connection with the work of the United States Geological Survey, and urging the Senators of Pennsylvania to support the measure.

The endorsement of the Franklin Institute deservedly carries great weight, and no doubt time will show more accomplished toward the establishment of a Department of Mines and Mining, with the secretary a cabinet officer. If the resolution passed by the Institute had been for a department of mines and mining by itself, instead of a division under the United States Geological Survey, it would have met the universal approval of all interested in the mining of precious metals.

ONE of the brightest writers and best informed men on mining matters in the State of Utah, Mr. Will C. Higgins, has established a publication in Salt Lake City, Utah, *The Mining Review*, the first copy of which we are just in receipt of. The paper is a neat 9"x 12", three-column, twenty-page journal.

In their salutatory the publishers say :
 " The marked change in mining conditions during the past eighteen months, however, the lively and active interest taken the world over in mining affairs, the urgency with which capital is clamoring for opportunities for investment in safe and legitimate enterprises, and the vigor and energy with which mining men and owners of mining properties are pushing exploration and development work in hundreds of mining camps throughout the west, the north and the south, has opened a new field for the establishment and publication of a mining paper, and this field *The Mining Review* proposes to fill, and in such a manner that it will be the standard authority par excellence in mining matters wherever it may circulate."

COPPER and copper properties are being searched for and discovered in all sections of the country. Owners of copper claims, who have been in hard luck for years, because of the low price obtained for that metal, now have nothing to complain of. The red metal has reached a market value such as has never been witnessed in this or other countries, and the present demand for it will probably keep it at the figures quoted for some time to come, and may never go as low as the price quoted in 1897 and 1898.

THE Tehachapi *Times* is a bright, newsy little paper, well edited and managed by Grey Oliver. It is published weekly and advocates the Southern California Branch of the State Miners' Association.

COLONIAL EXPANSION AND SILVER.

It is not impossible that the recent acquisition of territory will have an important effect upon the money question and the silver mining industry. Depreciation in the price of silver has had the effect to discourage silver mining and to stimulate the search for gold properties and their exploitation. This has not been on account of the increased price of gold, for it will never go above the coinage value. Before artificers in gold will pay more for the bullion than its coinage value, they will melt the coin and use it. The real cause of the falling off in silver mining is that the product, except in a few cases, will not yield a margin above the cost of production.

The falling off in the price of silver has not resulted from the increase of supply, but the decrease of demand through its disuse in large measure as a money metal. The demand for it is confined to uses in the arts and manufactures, and in subsidiary coinage. Adoption of the gold standard has enlarged the demand for gold and rendered it impossible for it to recede below the coinage measure.

Being capable of being the greatest silver producing territory in the world, the United States has suffered much through the depression in the price of silver, in fact, nearly one-half of what might have been added to the national wealth could silver be mined at remunerative prices, the production would be immensely enlarged and the wealth of the nation very greatly increased. Stimulation of the silver industry would not necessarily reduce that of gold mining, as gold to a considerable extent exists in silver ores, it is probable that to enlarge silver mining would increase gold production.

The people of the islands which we have lately acquired are familiar with silver money, and are not prejudiced against it. Unless our government forces on them the gold standard in the effort to bring about "benevolent assimilation," there will be a large field opened for the use of silver money, and consequently a larger demand for the products of silver mines.

We notice that the government has sent to Cuba a large sum in silver coins, among them silver dollars, with which to pay off the Cuban troops.

This is said to have been done because the Cubans are willing to receive it, in fact, are anxious for it. If the silver dollar is debased money, as is charged by the gold standard advocates, it would seem to be wrong to palm it off on the helpless and half-civilized Cuban people as good money when it is characterized as trash here at home.

The Filipinos are willing to receive silver coins, and unless the gold policy is enforced on them, the Philippines will be a large field in which silver coins will enter into general circulation. Unless the gold standard is forced upon the people of our new acquisitions as a pretended means of promoting civilization, we may look for a larger demand for silver, and a material increase of its price in the markets of the world.

If our new people are to be supplied with silver money because they are willing to receive it and want it, why would it be wrong to comply with the wishes of a large body of the people here at home, who are willing and anxious that silver coins should become a part of the national circulating medium?

The capacity of the works of the Detroit Lubricator Co., of Detroit, Mich., has been overtaxed during the past few months by the quantity of orders received from foreign and domestic firms. They are now installing a large number of new lathes and other machinery, so as to be able to insure prompt deliveries on future orders.

The Weber Gas and Gasoline Engine Co., of 434 Southwest Boulevard, Kansas City, Mo., reports the following recent shipments:

One car load eight engines to Southern California.

One 10-H. P. hoist for Sonora, Mexico.

One 25 H. P. hoist for Silverton, Colo.

One 10-H. P. engine for Havana, Cuba.

They also report the installation of a plant entirely furnished by the company for pumping the sewage from the city of El Paso, Texas, during flood time of Rio Grande river. This consists of two direct connected 10-H. P. Weber gasoline engines and two 8" Morris pumps.

All our readers will be interested in the advertisement of Keuffel & Esser Co. because this company furnishes everything required for drawing and measuring. They are probably known to most of our readers, as they are the recognized leaders in their line of business, their goods are the standard of quality and their generously distributed catalogue is in the hands of every professional. They make most of their goods and absolutely control nearly all goods which they import, and they warrant all their goods to be exactly as represented, or better. They carry an immense assortment and probably the largest stock of any house in the world in their line. Their lavishly illustrated catalogue of over 400 pages is a model of terse but efficient description and is sent free of charge to professional people applying for it.

Ontario Mining.

Mr. Archibald Blue, director of the Bureau of Mines, has communicated the following interesting particulars regarding mining industries in Ontario last year:

The copper and nickel mines of the Sudbury country gave employment last year to an average of 610 men, and the amount of wages paid for labor was \$315,000. All the ore raised at the mines was smelted and reduced to matte, in which state it was exported to the United States to be refined. The estimated quantity of fine copper in the matte is 8,373,560 pounds, valued at \$268,080, and of fine nickel 5,567,690 pounds, valued at \$514,220. These valuations are based on the selling price of the matte at the works, which is about one-third of the market price of the refined metals. The total value of nickel and copper is \$782,300. In 1897 the total value was \$559,718, and in 1896 was \$487,660. The amount of wages paid for labor in 1897 was \$253,256, and in 1896 \$47,151.

The production of gold bullion last year 16,175 ounces, valued at \$271,906, but this does not include the output of a mine on the Seine River, for which returns have not yet been received. It is understood that Mr. Blue refers to the Golden Star. In 1897 the bullion product of the Province was 11,412 ounces, in 1896 7,154 ounces, and in 1895 3,038 ounces, and it is expected that this

year will show an increase, both positively and relatively, much greater than in the past four years.

The production of pig iron in the Province last year was 48,253 short tons (tons of 2,000 pounds), valued (at the selling price at the works) at \$530,789. The industry gave employment to an average of 130 men, and the total amount of wages paid for labor was \$61,476. With the establishment of the new smelter at Deseronto, there will undoubtedly be a great increase in the production of pig iron during the coming year.

Utah Mining Stocks

The following late reports of the condition of mining stocks listed on the Salt Lake City Exchange will be found of interest to the investing public:

Four Aces was very active at last week's figures. The mines are reported to be looking very well and better prices on the stock are predicted in certain quarters. Under fair buying, Geyser-Marion strengthened a few points. An improvement in the showing at the mines is reported by the management. On the 10th, Grand Central paid its regular dividend. No particular change occurred in the stock. Victoria is not being offered under \$1 with 75c. freely bid. Hoisting machinery has been purchased by the Victoria company and the active development of the ground is to commence at once. Ingot remained practically unchanged, doing some business at last week's figures. Joe Bowers is sending in some good ore, but the stock continues to fluctuate considerably and lost some strength during the week. Joe Bowers' Extension was a ready seller around last week's prices. Some very nice developments are again reported from the Lower Mammoth. The stock sold down to 78c., but took on new strength toward the close and gives promise of still higher prices. A persistent buying movement was on in Little Pittsburg, and the cheap stock seems to have been pretty well taken up. The close was considerably stronger.

Although doing heavy business, Mammoth clung closely to last week's close, going off but a few points. No change in the situation at the mines is reported. There will be no dividend on Mercur this month and probably none will come before June, although May is a possibility. The mines are looking and doing well. The stock remained around last week's close. Northern Light was very active and made rapid advances. Some very high grade ore is being sacked ready for shipment and the mines are officially reported to be making a very much improved showing.

Omaha was somewhat lower, while Ontario developed new strength, on very light business. Overland will have a Boston office. Sunshine was hardly as active as was the case last week, but there were few sellers in and buyers held off in the hopes of a break coming, that they might get in at better prices. Mr. Peyton has not yet assumed full control of the properties, but may do so at any time. Swansea was strong, as was also South Swansea, which sold close to \$1.30. Showers Consolidated reported a nice strike of ore and the stock moved up several points, to 46c., reacting to 42c. on profit taking. Heavy dealing was done in Star Consolidated, prices remaining nearly unchanged. Sacramento sold off to 45 cents. Tetra is pushing development work, making six feet daily. The stock was stronger. Veleo was a heavy trader at changing figures.

ANTIMONY MINES.

MOJAVE, CAL., April 10, 1899.

EDITOR JOURNAL:—The group of Antimony mines 20 miles N. E. of the town of Mojave, Cal., were located by Mr. George Aitken of Los Angeles in 1897, but on account of light demand for Antimony they were not worked continuously until Feb. 1898. When W. R. Johnson of Mojave secured a working bond on the property, since that time the property has developed into a producing and permanent property, and has passed the prospective stage. On April 1st 1899 the property changed ownership. The lucky owners now are San Francisco business men, which have formed themselves into an incorporated company, and will erect a plant on the ground for the reduction of the mines product. The company has for its Manager Mr. A. Blanc of Oakland, Cal., a gentleman of extensive experience in mining, (especially Antimony.) The new company have purchased machinery with part of it is now at depot ready to be hauled to mines, they have also purchased the six mule Barn from the Pacific Borax Co., that was used for Home Station by Mr. Searles when shipping borax to Mojave. This building is 40x100 feet and will give them plenty of material to cover furnaces, bunk-houses, cook shop, etc.

The company paid twelve thousand dollars net cash for the Antimony property and they don't seem to be scared about the great mystery surrounding the working of Antimony ores which was recently published in the *Call*, and re-published in your JOURNAL of March 15, 1899.

This will not be a little unobserved industry, but a plant with all the modern improvements for working Antimony ores. The demand for Antimony has been limited, but now there is a good market, it will be worked on business principles and with modern improvements. The primitive way of working Antimony ores will now be done away with,—I mean the old way of charging the crucibles with 40 or 60 lbs., their handling with large tongs really playing with—what should be a great industry. All of which the mine owner had to pay for it he was compelled to ship. This process which no doubt originated in Mexico would do in the wooden plow ages. When the miner gets fair returns for his labor, he generally is satisfied.

This group of sulphide of antimony mines consists of four full claims 600x1500 feet and are situated 20 miles N. E. from the town of Mojave, a railroad junction of the S. P. and Santa Fe R. R. A good wagon road to the mines. The general formation of the country rock is granite with dykes of porphyry cutting through the granite. This is a true fissure contact vein, laying between granite and porphyry course of the vein being S. E. and N. W. and fetches about 15 per cent, two good smooth walls enclose the ledge, which will average 20 to 4½ feet wide between walls. Vein of ore is regular and will average 20 feet thick and unlike other antimony mines not in bunches as is generally the case. It is estimated that there are from 250 to 300 tons of ore on the different dumps. Just as extracted from the mines which will assay somewhere in the 40 per cent class with a little cleaning this could be made to run from 50

to 70 per cent. A map accompanies this which shows surface workings of claims, their location, etc.

At bottom of 65-foot shaft (Stibnite) drift, has been run on ledge West 40 feet, East 50 feet, with good showing in both drifts. In 88 foot or Metallic shaft at bottom drift has been run East 40 feet, also one about half way in this shaft East 38 feet. All development work done shows improvement in quantity and quality of ore. Some little water is encountered in this Metallic shaft, about 2 Bbls. in 12 hours and the owners are in hopes to get sufficient when depth is attained for all mining and reduction purposes. As the spring is distant ½ mile from the mines, and about 400 feet lower, which affords about 10 or 12 bbls. of water per day. Cost of hauling ore to Mojave about \$3.00 per ton or less owing to quantity. About 2,000 cords of Juniper wood on and surrounding the property close in an abundance of large timber (pine, fir and pinon) within from 3 to 5 miles of property, and as these mines lay in rolling hills, nature has nearly provided the wagon



roads inwards. The facilities are good for reducing the product of the mines, thereby saving considerable in freight. This is absolutely a sulphide of antimony ore. No lead, zinc, or Arsenic. The smelting not difficult. No snow to interfere with working the property the whole year. Yours truly,

W. R. JOHNSON.

MONEY IN MINING.

People who have not studied the subject have for the most part very imperfect ideas as to what is being done, not only in the United States, but also in various foreign countries in the way of gold and silver mining. To such may be recommended a careful examination of the facts and figures set forth below.

Only the most prominent example cases are cited in this article, as space forbids anything like a list of the mines that have paid over \$1,000,000 in dividends all of which are on record.

In the first place the output of gold in the

United States in 1897 was according to official reports, as follows:

PRODUCTION OF GOLD FOR THE CALENDAR YEAR 1897.

States.	Fine Ounces.	Value.
Alaska.....	130,624	\$ 2,700,000
Arizona.....	130,624	2,700,000
California.....	725,689	15,000,000
Colorado.....	947,249	19,570,639
Idaho.....	96,750	2,000,000
Montana.....	217,534	4,469,431
Nevada.....	145,138	3,000,000
New Mexico.....	22,738	470,000
Oregon.....	65,534	1,354,593
South Dakota.....	256,410	5,300,000
Southern States*.....	12,082	249,737
Utah.....	89,305	1,845,938
Washington.....	21,715	449,664
Other States.....	3,136	64,796

Total..... 2,864,576 \$59,210,795

*South Carolina, North Carolina, Georgia and Alabama.

The record that has been made by some of the individual gold and silver mines of this country is simply amazing. For instance:

The Comstock Lode of Virginia City, Nev., has produced gold and silver in the last twenty years the enormous sum of \$320,000,000; most of this ore yielded but \$8 per ton in gold.

The Witwatersrand, of South Africa, produced in the first year (1887) only \$405,000, but in 1895 it had increased to \$40,000,000 per annum, while the output for the ten years exceeds \$200,000,000. In 1897 it was about \$51,913,607.

The Calumet and Hecla has paid \$60,850,000 in dividends alone.

The Anaconda, of Butte, Mont., which was sold for \$40,000,000 to the Rothschilds, paid that amount in dividends before selling.

The Alaska Treadwell Gold Mine, with ore running less than \$3, has paid \$3,995,000 in dividends.

The Ontario, of Utah, has paid \$13,557,500 in dividends.

The Mollie Gibson \$4,080,000.

The Granite Mountain, \$13,000,000, the stock selling from 10 cents per share to \$75 inside of two years, and paying 50 per cent. in dividends each month.

The Homestake, of S. Dakota, on \$3 ore, has paid \$3,333.33 in dividends every day it has run for the past ten years.

There have been enormous sums of money made also, in buying and selling the stocks of some mining companies, altogether, irrespective of the dividends earned by the properties on which those stocks were based. The figures given below are taken from the official records:

Yellow Jacket stock rose from \$42 to \$275 per share in 1872, and from \$55 to \$158 in 1875; in 1866 it advanced from 80 cents to \$12 per share. The company has paid \$2,184,000 in dividends.

Union Consolidated advanced from \$6 to \$93 in 1875, and has shown very large profits in other years, selling at 9 cents and \$10 in 1886.

Standard Consolidated stock was placed in the market in 1879 at \$20 per share, or at the rate of \$2,000,000 for the mine. It sold the same year at \$35.75. It has paid \$3,839,226 in dividends.

In 1878 Sierra Nevada advanced from \$3 to \$183 per share.

In 1872 Savage advanced from \$46.50 to \$620 per share. It has paid \$4,460,550 in dividends.

Ophir advanced from \$21 in 1873 to \$290 in 1875.

Ontario was placed with the public at \$18 to \$20 per share, or at the rate of \$1,800,000 to \$3,500,000 for the mine. After paying for years large dividends it sold at \$48. It has paid \$13,557,500 in dividends.

Kentuck sold at \$7 in 1871, at \$545 in 1872. Homestake was placed on this market in 1879 at \$17.50 to \$20 per share, or at the rate of \$1,750,000 to \$2,000,000 for the mine. It more than doubled in value in the same year, and is now selling at about double the original selling price. It has paid \$7,306,250 in dividends, and is said to have twelve years' ore blocked out and in sight.

Hale and Norcross sold at \$46 in 1871, and \$672.50 in 1872.

Gould and Curry sold at \$45.50 in 1871, and \$520 in 1872.

Crown Point advanced from \$274 in 1871 to \$1,825 per share in 1872. This mine has paid \$11,898,000 in dividends.

Consolidated California advanced from \$93.50 in 1874 to \$700 in 1875.

Consolidated Virginia rose from 11 cents per share in 1885 to \$65 per share in 1886.

Chollar sold at \$29 in 1871 and \$275 in 1872.

California sold at \$125 in 1874, and \$765 in 1875.

Bodie advanced in the 70's from about \$1 per share to \$75 declaring at one time several dividends of \$100,000 each in one month.

In 1866 Best and Belcher advanced from 60 cents to \$23.50. Belcher sold at \$6.50 in 1871, and \$1,550 in 1872. This mine has paid \$15,397,200 in dividends.

While the increase of the world's production was in 1896 eight per cent, the increase in the United States was twenty five per cent. The extent of gold bearing territory in the United States is so great and the resources of the known fields are so well established that it is safe to say that the aggregate production of gold in the United States exclusive of Alaska, in the next twenty years will not fall below, and will probably greatly exceed, the astounding sum of one billion dollars.

New processes have been adopted and have

made possible the profitable working of vast fields of low-grade ore hitherto unprofitable, and we are now fairly entering upon the greatest era of gold production the world has seen.

The greatest gold producing countries at present are the United States, Australia Transvaal, and Russia, these four producing about three fourths of the total product from one-quarter to one-seventh each.

Russia probably has the richest mines — those that will last the longest and produce the largest total — of those now worked but as they are not "free", but the private property of the Czar, very little attention is paid to them. The following table shows the actual gold production of the world for 1897:

United States.....	\$59,210,795
Canada.....	6,190,000
Mexico.....	7,121,189
Central America.....	525,000
Argentina.....	314,907
Bolivia.....	65,000
Brazil.....	1,462,120
Chile.....	1,407,544
Colombia.....	3,900,000
Ecuador.....	132,900
Guiana, British.....	2,098,098
Guiana, Dutch.....	681,748
Guiana, French.....	1,227,310
Peru.....	119,628
Uruguay.....	144,600
Venezuela.....	814,067
Australasia.....	53,429,759
Austria-Hungary.....	2,178,556
France.....	217,304
Germany.....	1,848,146
Italy.....	182,557
Norway.....	10,335
Russia.....	21,538,490
Sweden.....	76,107
Turkey.....	8,000
England.....	127,967
China.....	6,641,190
India (British).....	7,299,554
Japan.....	713,300
Korea.....	721,765
Malaysia.....	516,750
Transvaal.....	51,913,607
All other.....	92,715

Total..... \$232,924,882



JEFFREY COLUMBIAN SEPARATOR.

Jeffrey Columbian Separator-Screen and Bolter,

With this, we illustrate the Jeffrey Improved Columbian Separator. This separator has made a wonderful record in the cement industry, while it is also gained a strong hold in other industries, more especially in the treating of ores, lime, and, phosphate, rock, earth, clay, etc.

It is built substantially of hardwood and consists of a well built frame in which the vibrating screen is located. The screen frame is connected to electric rods which give it a quick movement, and being confined at its corners by special nut and screw device, the vibrations thus made keep the screen in a perfectly live state. The screen frame is adjustable, so that it can be set at various degrees of inclination, to suit the material handled.

Another important feature of this screen is the feeding device, which consists of a special spiral conveyor and casing, so made as to distribute the material uniformly over the entire surface of the screen.

This separator is supplied with various meshes of screening cloth any where from one-fourth mesh up to 100 meshes to the inch. To obtain a 50 mesh product 30 to 35 mesh cloth is used. To obtain 200 mesh product 60 to 70 mesh cloth is used. In handling quartz and precious ores the fine mesh cloth is supported by means of a coarser mesh cloth which relieves the finer cloth of the weight without materially interfering with its screening capacity. For more specific data it will be advisable to address the manufacturers, the Jeffrey Manufacturing Company of Columbus, Ohio.

A Safety Cage.

The incline safety-cage recently completed by the Sonora foundry at Sonora, Tuolumne county, California, for the Eagle-Shawmut mine was tested at the foundry under the personal supervision of D. Paterson and in the presence of a large number of interested persons, including many prominent mining men and mechanics. The cage was loaded with 4,000 pounds of iron and then cut loose. It stopped after going just three inches, and, though several tests were made, the result in each case was just the same. Without a load, the cage called a halt in precisely an inch and one-half. The tests were thorough, and the apparatus was accepted by the Eagle-Shawmut representative on the spot. It would now be a good move for all mine owners who value the lives of miners to equip their properties with similar cages. The one tried is the invention of Mr. Paterson, and is said to be the strongest, most perfect working and safest on the market.

The Sullivan Machinery Company of Chicago has opened a New York office in the Empire Building, Broadway, which will be in charge of Mr. Arthur E. Blackwood. The company states that Mr. Blackwood will be pleased at any time to make quotations on the company's regular lines of machinery—diamond prospecting drills, rock drills, channeling machines and coal mining machinery.



JEFFREY COLUMBIAN SEPARATOR.

THE REPUBLIC MILL.

We produce herewith an illustration of the famous Republic Mill, the plant which has turned out so much great wealth to the stockholders. In our last issue we had an article giving the history of the Republic Camp and other information of interest to our readers. We expect in future issues to illustrate the different mines of this camp, and hope to give a detailed review of the great Republic Mill. Electro-cyanide is used in connection with the stamp mill, and a good percentage of the values are saved.

The report of a test lately made by R. B. Turner on ores from this district will be found in another column of this issue, which shows a very successful result obtained by amalgamation and cyanide.

Republic, Washington: Republic, San Poil, Mountain Lion, and Black Tail. The ores from the four mines were made into a mixture, thereby making one lot, which assayed per ton: Gold 1.26 ounces, figured at \$20 per ounce, gives gold values of \$25.20; silver, 4.24 ounces, figured at 50 cents per ounce, gives silver value of \$2.12, or a total value per ton of \$27.32.

This mixture was divided into several separate tests, and the following results were obtained by cyanide:

"Forty-three hour leach saved 40.4 per cent gold and 16.7 per cent silver.

"Ninety-one hour leach saved 51.7 per cent gold and 40.5 per cent silver.

"One-hundred and forty-four hour leach saved 67.8 per cent gold and 52.4 per cent silver.

solution showed perfect work and bullion recovered checked the samples taken and assayed.

AN ADDITIONAL SAVING.

"Having so far recovered by cyanide 74.8 per cent of the gold and 60 per cent of the silver on a product that is practical to crush and leach at a moderate cost, it became necessary to save a further percentage of what was left and to do so in the form of bullion, on account of the camp being 80 miles from railroad transportation. The desired result was reached by crushing the tails wet from the cyanide plant to a 100-mesh which amalgamated 57.5 per cent of the gold and 24 per cent of the silver that remained, thereby making a total bullion saving of 88½ per cent of the gold values and 69 per cent of the silver values in the form of bullion.



THE REPUBLIC MILL, REPUBLIC CAMP, (COLVILLE RESERVATION), WASHINGTON.

Cyanide Process at Republic.

As stated in our issue of April 15th, we publish the following report by R. B. Turner, on a test of ores from various mines in the Republic Camp, made for George H. Casey, of the Butte Sampling Works. The tests were by straight cyaniding and amalgamating, and not by the electro-cyaniding process in use in the Republic Mill, and gave most satisfactory results. The report follows:—

"BUTTE, MONTANA, March 6, 1899.

To Geo. H. Casey:—As per your request, I herewith submit a summary of tests made on the Republic ore, having already handed you a detailed report.

FROM FOUR MINES.

"The ore received consisted of about 3,500 pounds, coming from the following mines in

"One hundred and eighty eight hour leach saved 70.7 per cent gold and 57.2 per cent silver.

"Two hundred and twelve hour leach saved 74.8 per cent gold and 60 per cent silver.

WAS A THIRTY-MESH PRODUCT.

"This was accomplished by a 30-mesh product by a 5-10 of 1 per cent cyanide solution, entailing a loss of 3 ½ pounds cyanide, one pound of dioxide of sodium and a half pound of zinc to the ton of ore.

"The cyanide tests were made in a practical mill plant and using the same solutions over and over again, and between each reusing the solutions were passed through a zinc box for the recovery of the gold and silver values. The extraction of zinc from the

"A further saving of 1½ per cent was made by the concentration, the concentrates having a value of \$20 in gold and \$3 in silver. At the present time the concentrates have no market value unless arrangements are made to treat them on the ground. With concentrating, a saving of 90 per cent of the gold is made.

A SAFE AVERAGE.

"In mill operations it is safe to depend upon an average saving of 85 per cent of the gold and 65 per cent of the silver.

"The foregoing report is made upon the best method of treatment to meet the conditions existing in the Republic camp, giving a practical milling process at a moderate cost with a good percentage of saving. It is a result of a large number of tests made upon a product ranging from 30-mesh to 120-mesh.

different strengths of solutions and various hours of treatment; also on regrinding the tails to different meshes and amalgamating in various ways.

"Determinations have been made showing at what fineness the gold is released from the silica so as to be attacked by the cyanide, and also by amalgamation, but practical work in a mill compelled a certain kind of crushing and also to keep within a good leaching product.

NO USE FOR CHLORINATION.

"I have also tested with chlorination, which compels a roasting, but find nothing to be gained by its use.

"In all over 25 different tests have been made and over 250 assays.

"The charge for treatment in a custom plant as report calls for will be very close to what is charged by the mills of the Cripple Creek district of Colorado. The actual cost of construction of a plant to do this work will be about \$300 per ton of capacity.

Respectfully submitted,

R. B. TURNER "

CORRESPONDENCE

CALIFORNIA.

A Well-Defined Ledge.

(From our Special Correspondent.)

VIRGINIA DALE, CAL., April 20, '99.

The owners of some of the best prospects in this district are working faithfully to convince some of the would-be experts, that have said that the ledges in this district would not go down, of their mistake. The O. K. mine is about the best developed mine in the district. It is down 200 feet, and the ledge at that depth is more than twice the width it was at the surface, and is better ore. Joe Ingersoll, of San Bernardino, Cal., is the present manager of this mine, and it has seemed like a different mine and a different company ever since Mr. Ingersoll assumed charge. Mr. Ingersoll is not an experienced miner, but the secret of his success is that he is a sensible business man, and knows enough to employ men to act under him who understand their business, and know exactly what to do. Mr. Ingersoll does not pay boys a salary to learn the cyanide business, practicing on his ore, but has secured the services of one who knows his business, a thoroughly practical man, to come and straighten things out. Mr. Ingersoll intends to sink another 100 feet more right away, which will make the shaft 300 feet deep.

The O. K. ledge seems to be one of the strongest leads in the camp, there being about 18,000 feet of this ledge located, and every prospect in it seems to be improving as developments go on.

The following is a description of the O. K. ledge. Commencing at the south end, and going north, first, we find the Greenhorn, belonging to F. C. Baird, and Frank V. Perry, of Rialto, Cal.; second, we come to the M. L., belonging to Dr. Palmer and Frank Wellington, of Los Angeles. Third, we come to the O. K., belonging to the O. K. Company; fourth is the Gold Basin, No. 2, belonging to Isaac Reed; fifth is the Single Standard; sixth is the Dale, belonging to Isaac Reed and F. C. Curtis; seventh is the Pipton, belonging to Mr. H. B. Botsford, of Los Angeles; eighth is the Jumbo, belonging to Ellerman & St. German; ninth is the White Star, belonging to Furguson Bros. Besides,

Furguson Bros. are said to have three more locations, straight on north of the White Star.

The Greenhorn has a prospect shaft 12 feet deep. The M. L. has two prospect shafts, each 10 feet deep. The O. K. one 20-foot shaft, and main shaft 200 feet in depth. It has 250 feet of drift at the first fifty foot level, with upraise to the surface. At the 100-foot level, it has a drift north 100-feet, and south 200-feet, with upraise to the 50-foot level; and at 150 feet depth it has about 200 feet of drift, running south, with upraise to the 100-foot level, and are drifting north and south at the 200 foot level. There has been no ore stoped from this mine yet.

The Gold Basin, No. 2, has two shafts, one 50 feet and one 110 feet deep.

The Single Standard has a tunnel about 50 feet in. The Dale has one shaft about 30 feet deep. The Jumbo has one shaft about 80 feet deep, and another about 130 feet deep, with about 100 feet of drift. The White Star has one shaft down about 150 feet, with some drifts and a tunnel 1400 feet in length. All the above prospects improve as fast as the developments go on. DALE MINER

UTAH.

(From Our Special Correspondent.)

SALT LAKE CITY, UTAH, Apr. 18, '99.

EDITOR JOURNAL:—There was a noticeable increase in interest and consequently in business in the mining share market last week, and prices generally are much firmer. The spring weather is opening roads and making it possible to commence ore movements from several districts which have been isolated for weeks by snow. Three companies declared dividends and several important mine developments were reported, all tending to a renewal of activity in the mining security market.

Some important and much needed shaft improvements will at once be made at the Ajax. Something in the neighborhood of \$10,000 will be expended. The stock is stronger than at last week's close. It is being taken on by very conservative people. Anchor, Alliance and Alice were not active and remained about stationary. Bullion-Beck declared its regular dividend of 10 cents per share, payable on the 15th. A continued demand for the stock made higher figures, although the volume of business transacted was not especially heavy, offering of the stock being very light. All preparations for the starting of the mill are being made. April 15th, the Centennial-Eureka paid its monthly dividend of 50 cents per share. The mines are looking very well, indeed, and the stock continues strong and in demand. Chloride Point sold off somewhat, but developed good support under the one dollar mark. The mill will soon resume operations, as the cold weather seems to have passed.

Daly was in better tone and closed with only light offerings. Only very light work is being done at the mines. On account of the delay in the movement of ore from the mines, Daly-West sold off somewhat, weak holders taking their profits rather than await the higher prices that should come within the next month or two. Several heavy buying orders are out at figures near the \$10 mark. The properties are in most excellent condition and very fine ore is being raised and placed in the bins ready for shipment. The mill is operating nicely. Persistent buying of Dalton & Lark held quotations on that stock near last

week's close. All stock offered has been quietly absorbed. Dalton's assessment was very generally paid. Development work at the properties is going ahead nicely. Dexter was somewhat firmer. The management announces that the water famine at the properties has been broken, and operations should now be more vigorous than from some time past. Daisy was a puzzle. Always a heavy dealer, the stock showed great activity, but toward the close broke badly, touching its lowest figures. The mines have been thoroughly sampled by experts this week and some changes ordered at the mill. The ore showing is very fine and Mr. Dern expresses himself as being confident of the high value of the properties. If the ore shows an average value of \$5 there can be no doubt as to the future of the stock. Eagle and Blue Bell was not as active usual. The ore now taken from the new strike is reported to go better than \$100 in gold.

WISCONSIN.

(From Our Special Correspondent.)

WEST SUPERIOR, WIS., April 12, 1899.

EDITOR JOURNAL:—The opening of the season in the Seine River country in Western Ontario promises to show some active developments. During the winter the Golden Star has become a dividend payer, and the work of development on the Alice A. is progressing so that it is likely to be a producer in a few weeks. The Randolph property, which is located near the Alice A., has been organized and contracts are let for extensive work to be prosecuted at once. Work is also being prosecuted on the A. D. 2. These mines are all situated in the Seine River country.

There are prospects of the Lead and Silver properties in the Thunder Bay district, on the north of Lake Superior, being opened up this Spring. Also the Mikado and Sultana in the Lake of the Woods district continue to report increase in outputs.

Work on the Douglas county copper range is progressing rapidly and it is likely that contracts for equipment will be made for at least two of the mines, the Percival and North Wisconsin.

Captain John Thomas of the Michigan copper district has been engaged as superintendent of the Fond du Lac, and is at work with a crew preparatory to the sinking of the main shaft to a depth of 200 feet.

The Boston parties interested in the Stark-weather have had an expert on the ground, who will report to the company as to the plan of development.

The Culligan, which has been tied up in litigation, will probably be organized in a week or so and development work will commence.

Land on the copper range has gone to higher figures and the opening of the season promises a great rush into that section.

The copper belt lies about fifteen miles south from Superior and extends across Douglas county. The copper all occurs "native."

KIRBY THOMAS.

Miscellaneous Mining News.

ARIZONA.

Word comes from the Azurite that a very rich strike has been made in the Manes shaft No. 1 of high-grade sulphides of iron.

The force of miners employed at the Helvetia mine in the Santa Rita, about thirty miles southeast from Tucson, will be increased to

200 in a short time. The Calumet and Hecla company, which purchased the property for \$55,000 in December last, proposes to expend \$100,000 in developing before a smelter is erected.

News comes from the Black Diamond group in the Dragon mountains that the contractors report a rich body of sulphides of copper. The extent of the new strike is not yet demonstrated, but twenty feet of the ore opened up and no signs of a wall would indicate that a large body had been encountered. The strike is regarded as one of much importance and still further demonstrates that the copper belt of the Dragon range, in which the Black Diamond is located, possesses unlimited wealth in copper.

Ore valued at \$125 per ton is now being taken from the lower tunnels of the Green Tunnel mine Union Basin.

CALIFORNIA.

AMADOR COUNTY.

The Kennedy Mine

The Rex air compressor recently set up at the east shaft of the Kennedy mine at Jackson is a splendid piece of machinery. The air cylinder is 35 3/4 inches and is of sufficient compressing capacity to operate six power drills. The compressor is "tandem" with the Corliss engine which operates it, the cylinder of which is 14 inches in diameter, with a 30 in. stroke. These pieces of machinery are set up so that their duplicates may be installed beside them. The engine carries a 9000 pound flywheel which is grooved for the introduction of any power besides steam by the use of transmission ropes. The engine and compressor are set on a solid concrete foundation in a building about fifty feet from the boiler room, while the air receiver is at the collar of the shaft, about 120 feet away from the compressor. The receiver is 42 inches in diameter and 20 inches long. *Amador Ledger.*

The Goyer

The shaft of the Goyer mine near Darktown has been caving considerably during the winter. The hoisting machinery, which stood on the hanging wall of the shaft, which is at an angle of about 45 degrees, commenced to settle and had to be moved back in order to save it from being seriously injured.

MAVERICK COUNTY.

The Demarest gold mine near San Andreas is looking fine at present. A new boiler of large capacity has just been put in and the mill will be started on rock from the 500 foot level this month.

The Diamond Lee Mining Company of Collierville has doubled its mill capacity in order to run the rock from the Deer Lodge mine, which is said to be good paying ore.

The McNear mill, near Murphy's, started last week on a run of several hundred tons of rock from the Red Gold mine, which is being worked by Messrs. Hurd, Bunney & Seantleberry on shares with the owner, Mr. Safford of Agnews.

NYO COUNTY.

Johnson Bros. and Ralph McGinnis have opened up a prospect in the Inyo east of Independence that has every promise of becoming

ing a good mine. They have been working several weeks on a ledge of 10 feet that shows assay values of from \$20 to about \$140.

Robt. and Elias Blake have a new mining discovery near the summit southeast of Big Pine which makes a good showing in richness.

G. Sanger began last week shipping ore from below Waucoba in which he is interested with Messrs. Cornell and Danielson. If reports are true, the property is both valuable and extensive. About 100 tons of silver-lead ore are now out.

Messrs. Barnes and Anderson also have about a four foot ledge north of the Johnson location which shows free gold in quantity. They have extracted a carload for shipment during the last month which will be sent to Dayton. It is supposed to be an average, and will be worked as a test of the average of the ore.—*Inyo Register.*

KERN COUNTY.

Yellow Aster Notes.

The Yellow Aster Company declared a dividend of \$10,000 last week for the month of March.

The total cost of the mill as it now stands is about \$55,000.

The total cost of the mill and water plant and buildings connected therewith, including pipe line and pumping back plant is about \$125,000.

The machinery and equipments for the machine shop have been ordered from Wigmore and Sons of Los Angeles, and it will be thoroughly equipped and complete.

The mines are looking well, being now lighted throughout by electricity and the mill is kept running constantly, crushing an average of 140 tons of ore per day. This is not so rich as the former average when the ore was milled away from home and sorted, but the average will now run above \$20 per ton. *Randsburg Miner.*

Val Schmidt has just had three tons of ore milled at the Johannesburg Reduction Works, which milled a little over \$100 to the ton. This ore came out of the Nine Spot mine from a shaft only 37 feet deep. Mr. Schmidt left for Los Angeles last week to be gone three weeks on a business and pleasure trip.

SAN DIEGO COUNTY.

Charles W. Pauly Friday, April 14th, filed in the superior court his sixteenth report as receiver of the Golden Cross mines. The report covers the month of February and states that the cleanup on the 28th of that month amounted to \$31,117.01. The total amount disbursed during the month was \$12,703.39, which included \$11,500 paid to James Spiers in accordance with a stipulation and an order of the court. The report was confirmed by Judge Torrance.

It is reported from Mesa Grande that Sam Black of San Diego has made a rich discovery in his gold mine near the Shenandoah mine. He has been making a living out of the mine for a year past. The new discovery shows up ore worth from \$500 to \$1000 to the ton.

COLORADO.

The contractors on the Gillard at Wall Street having recently completed their contract for sinking the shaft, the company has put in a plant at the 100 foot depth, and started drifts on the vein both ways from the

shaft. The vein at this point is about three feet wide with a rich pay streak of from four to ten inches, and the company are taking out several tons of ore per day. The rich streak is being sorted and sacked for shipment to the smelters, and negotiations are in progress for the treatment of the milling ore of which the company have already some 60 tons in the bins awaiting shipment.

Another strike of great importance has been made on the Hannah Britt at Cripple Creek on the extreme western slope of Bull hill, near the summit and but a short distance from the Favorite mine. Drifting at the 110 foot level a rich shoot in the vein which is three and a half feet wide, has been encountered. Assays running from \$35 to as many ounces to the ton have been obtained from the minerals. The vein is owned by the Bull Hill and Squaw Mountain company.

The Ziegler and Jones lease on the J. I. C., one of the Battle Mountain claims of the Republic company have an order in for ore wagons and will send out about a two carload shipment as soon as the order can be filled. The grade of the ore is estimated at \$30 a ton, and as the lessees have opened up a big body of it in the 35 foot level, shipments should become regular.—*Mining Investor.*

IDAHO.

With the consolidation of the valuable and extensive properties of the Florida Mountain Mining Co. and the Trade Dollar Mining & Milling Co. on Florida mountain in Owyhee county will be found one of the most powerful corporations in Idaho.

The papers have been under the scrutiny of Boise attorneys for some time. Their examination completed, they are now ready to be signed in Pittsburg by the proper parties.

The consolidation takes in all the important mines on Florida mountain with the exception of the Black Jack and it is understood negotiations are now on foot to include that dividend paying property in the consolidation. This will in all likelihood be done as soon as the owners of the Black Jack agree among themselves upon the price at which to put the property in. Excluding the Black Jack, however, the consolidation as now agreed upon contemplates in its scope the operation under one management of one of the most extensive systems of mines in the west.

The consideration is \$1,500,000 and the deed by which the Florida Mountain properties are transferred will have attached to it \$1500 of revenue stamps. It is understood to be a stock transfer. The stockholders of the Florida Mountain Co., Wm. H. Dewey and his son, Edward H. Dewey of Boise Idaho, and J. M. Guffey and John H. Guffey of Pittsburg, Pa. have held a large interest in the Trade Dollar Co. all along and under the consolidation they will hold the control of all the stock.

MICHIGAN.

The water is down about 120 feet in the Moro shaft and will soon be at the knuckle in the shaft when the Cornish lift may be started. They have been using an air pump with great success and are now putting in steam pumps.

It said that the Cambria and Lillie mines of Negaunee have been absorbed by the Republic Steel Co., one of the latest to be organized.

Both are excellent properties that are in good shape, Senator Moitland having given them the best of attention.

There are 400 men now working at the Queen group of mines. They are working the Blue, Buffalo, Old Queen and are unwatering the Prince of Wales. Machinery is being secured for the New Queen. The company is figuring on working 1000 men the coming summer.—*Iron Ore*.

The air compressor has been started at the Rhode Island and the shaft is reported as looking as well as it ever has.

It is reported in Hancock that R. R. Goodell has sold the Hussey-Howe land recently purchased by him, to Standard Oil magnates.

From men at work on the Baltic it is learned that the showing at that property was never better. All the shafts are looking well, and in a short time the drifts connecting all the shafts will have been opened.—*Copper Journal*.

MINNESOTA.

The Minnesota legislature seems to be having as much difficulty with the state's mining interests as the recent California legislature. The pig-iron bounty law was killed by the farmers from the lower country. Now the bill introduced by Mr. Laybourn, which provides for a mining inspector for the state of Minnesota was killed by the house mines and minerals committee. Every state where mining is prosecuted to any degree should have a mining inspector to preserve the state's mineral wealth from the unskilled manner of working the mines.

MISSOURI.

Two new mills are to be erected on the lease owned by the Dividend Mining Co.

Wichita, Kansas, parties are doing some drilling in Cooper Hollow, having commenced this week.

It is reported that Carmen & Bryant have sold their Honey lease of 20 acres for \$60,000.

Hell's Neck has sold ore to the value of \$22,563 during the past three months. The new camp has made a good start for 1899.

The Hermit lease at the west end of Hell's Neck has passed into the hands of Ex-Senator U. Hendrickson, E. Davis, Wm. Gunning and others, who are getting it ready to open it up to miners.

Skaggs, Sanders & Co., in Cooper Hollow, made forty tons of ore with three men last week.

A new plant is to be built in Cooper Hollow by Ash & Co. of Cartage, on lots northeast of the Oliphant.

The Gold Bug mine on the Battlefield lease has recently passed into the hands of Cave Springs parties.

The top price of ore at Galena-Empire was \$46 for the North Empire output. Raines & Murdock sold theirs on condition it should bring top, but the general price was \$43.

The Oskaloosa mine's mill on the M. L. Smith lease has been in operation three weeks, and has made over 100 tons of ore in that time, no bad record for a new mill. They are now taking out their best stuff from the roof of the drift.—*Joplin Herald*.

MONTANA.

Sale of the Buckeye.

In connection with all its bearings, one of the most important mining deals that has been made for a long time was consummated a few days ago in the sale of the Buckeye mine by its owner, C. K. Riale, the purchasers being all Helena business men. The negotiations and sale were conducted and brought to a successful issue by W. J. Clark, who took possession of the mine and mill as a representative of the purchasers.

The ore is galena and iron, carrying gold and silver. Near the surface the ore, in character and value carried, enabled it to be shipped direct to the smelter. At the present depth of the workings, 200 feet, it is considered by many to be an ideal concentrating ore and is being reduced through a concentrator of 50 tons capacity, with which the mine is equipped.

The articles of incorporation of the Buckeye Mining Co. were filed the other day with the secretary of state. The company is capitalized at \$30,000, of which the amount paid in cash is \$3. The incorporators are Dr. William Treacy, Stephen Carpenter and Thomas B. Miller.

The purchasers are said to have paid \$10,000 on the bond and the purchase price of the property is reported as \$65,000.

The new owners will continue the development of the property and will increase the capacity of the concentrator as rapidly as the output capacity of the mine will warrant.—*Helena Independent*.

NEW MEXICO.

Output of Hillsboro Mines.

Output of Hillsboro gold mines for the week ending Thursday, April 6, 1899, as reported for the *Advocate*:

	TONS
Wicks.....	20
K K.....	15
Richmond.....	35
Snake Group.....	65
Opportunity.....	20
Sherman.....	5
Cincinnati.....	10
Tripp.....	55
Rex (silver-lead).....	5
Eureka.....	10
Freiburg.....	10
American.....	15
Warren.....	20
Total.....	285

Total output since January 1, 1899—3,850.

NEVADA.

The Holmes company of Candelaria has commenced work. A clean-up of the lower mill will be made and the work pushed continuously until the quicksilver wasted and lost in early days is recovered. S. A. Knapp, Clem Ogg and Frank Mills are doing the work.—*Hawthorne Bulletin*.

Silver Peak Litigation.

A. L. Kinsley writes thus from Carson concerning these cases:

In suit of L. J. Hanchett and Silver Peak mines, Judge Hawley held that any bond or claim of L. J. Hanchett was subject to the mortgage held by John I. Blair. A stay of

execution for five days was granted for Hanchett to raise bonds in the sum of \$600,000. They did not raise the bonds.

Suit of Chiatovich against Hanchett, libel. Verdict of \$4,700 for Chiatovich.

"The Peak will be all right," says the gentleman who furnished the above summary.

OREGON.

The gravel mines in the camp of Susanville are in full blast, with an abundant supply of water.

The Trail Creek mines in Granite district will be worked this year under the direction of John Laundry, one of the owners.

Pumping machinery for the Virginia mine has been purchased, and is expected to arrive here soon.

The Lily White group of mines and machinery, consisting of a ten stamp mill, will be sold shortly to satisfy a judgment. The property is owned by a Mr. Donica, a resident of Indiana.

The lessees of the Sanger mine are delivering ore to the Baker City Sampling Works that returns them \$82 per ton. The same character of ore milled at the mine returned only \$8 per ton.

Chas. M. Sage and W. E. Grace have bonded their Cable Cove mine to Portland people, and as soon as supplies can be got into the mine extensive development operations will be carried on.

F. W. Tallmadge, owner of the Sparta Canal and mining properties in that district, has bonded his Sawmill Gulch placer ground to E. L. Giroux, who will promote a dredging proposition. Mr. Tallmadge has also leased other placer claims to Newton & Schredler, of Baker City, who will operate them during the season.

Messrs. Kinnison and Robinson, who own the Badger mine at Pritchard Flat, east of the Virtue mine, are making arrangements for an early resumption of development work. One tunnel, 800 feet in length has already been run on the property.

Extensive development work will shortly commence on the Jay Gould group of mines, in the Gimletville district, under the superintendency of Wm. O'Donnel.—*Baker City Democrat*.

SOUTH DAKOTA.

Quartzite has been struck in the Mark Hanna mining ground, near the Two-Bit camp, at a depth of 55 feet. The owners of the ground are considered very fortunate in their work since they have encountered ore, or rather the quartzite carries considerable value at the shaft bottom. The ground joins the Monarch, from which shipments of ore are being made.

R. M. Maloney, of Deadwood, expects soon to commence developing the old Blue Lead mine, near Sheridan. A tunnel will be run into the mountain 1,000 feet, from which three crosscuts will be made. The district is a new one but has good prospects. In Friday gulch, north of Hill City, there are several very rich claims which contain verticals of free-milling ore. Hawk Wright is developing a vein which pans out nuggets and coarse grains of gold. One piece of rock gave him \$11 in the pan. The vein of ore is becoming wider with depth. Work is progressing satisfactorily in the Sunnyside mine, south of Friday Gulch district.—*Black Hills Mining Review*.

UTAH.

The Copper Rauch Mining Company was incorporated last week, with a capital stock of \$500,000 \$1 shares, to develop the Carmarthan, Copper Ranch, Jewell, and fifteen other lode locations, known as the Marguerite Nos. 1 to 15, situated in the Rock mining district, Beaver county.

The Horn Silver Mining Company has declared its regular quarterly dividend of 5 cents per share, or \$20,000, payable March 31.

The directors of the Utah Saltpetre company have let a contract for a shaft to be sunk a depth of 100 feet on the saltpetre ledge embraced in the company's holdings.

B. F. Woodward, of the Joe Bowers extension, says that they will sink 100 feet deeper without pumps, making a depth of 400 feet, after which with pumps will sink to a 700 foot level before cutting to the ledge. He also says that in the Blue Bird extension, at the 100 foot level, they encountered galena in the shaft, giving indication of a large body of ore. They have let a contract for an additional 100 feet in the shaft.

A splendid strike is reported on the 500 level of the Centennial-Eureka and made an opening for an increased force of miners at the famous old Blue Rock.—*Janb County Republican*.

WASHINGTON.

Republic.

The Lone Pine and Insurgent claims have been creating some excitement, with assays running from \$40 to nearly \$600 per ton, which, on the heels of the Gold Ledge strike, is making those properties interesting as well as attractive.

Now comes the El Caliph, with 10 or 12 inches of quartz which shows a neat sprinkling of visible gold. Two gold buttons were reduced from 8 pounds of quartz, from this property, that weighed 1.32 dwts. The shaft where the quartz came from is down about 50 feet, and the ledge at the bottom will sample from \$140 to \$150 per ton as it comes to the surface. The tunnel is in 270 feet, with the face in hard porphyry, and at 20 feet further it may cut the ledge. If the quartz upon the level proves as good as in the shaft, it should encourage the company to push the exploration of the vein with considerable vigor.

The Gold Leaf tunnel is now in 410 feet, and has passed through the sedimentary strata into oxidized porphyry, which gives low assays.

The Monroe tunnel is in 165 feet and may cut the east vein any day.

The Little Giant tunnel is in 165 feet, with the face in porphyry with more or less quartz showing that assays well, but no well-defined vein has yet been encountered.—*Miner and Electrician*.

FOREIGN MINING NEWS

BRITISH COLUMBIA.

Operations will also be resumed at the Whitewater Deep, with a full force of men, within the next six weeks, if the snow will permit. The weight of the snow has broken the flume, and it will not be feasible to repair it till the ground is bare. The starting of work on the Deep has been awaited anxiously for some time by the residents of Whitewater,

as the employment of from seventy-five to one hundred additional men, most of whom board within the limits of the town, means a large addition to the monthly pay-roll. The outlook for the future among the business men is considered to be better than ever before in the history of the camp.—*Kootenaiian*.

MEXICO.

Mexico's Mines.

Chihuahua's mines have been celebrated for centuries, and contain gold, silver, copper, iron, tin and lead; but the most noted are the silver mines, especially those of Batopilas, Jesus Maria and El Parrel in the Sierr Madre and those of Santa Eulalia in the plain just out of Chihuahua city, says the *Chihuahua Enterprise*. In fact, Chihuahua is one of the richest states in deposits of every kind. In the Cusihiuriachic district an American company has a mine producing \$600,000 annually. At Pinos Altos an English company has a mine which produces \$700,000 annually.

The Veta Madre lode of Guanajuato alone produced \$252,000,000 between 1556 and 1803.

In the same state the Conde de Valenciana and the Marquis de Rayas produced annually 4,400,000 ounces of silver or about one-seventh of the entire American output.

From January 1, 1787, to June 11, 1791, this same mine yielded 13,896,416 ounces of silver, its ore averaging a little over 100 ounces to the ton.

Don Romero Terreros took \$15,000,000 out of the Real del Monte mines in the state of Hidalgo. From 1774 to 1783 they produced \$400,000 per year, and from 1802 to 1809, \$300,000 annually.

Notable among the recent discoveries is the Sierra Mojada district in Coahuila.

The state of Durango has on the west slope of the Sierra Madre, the mining camps of Topala, Sianori, Birimoa, Gusanilla, Canelas, Ventanas, El Pando, Rodeo and San Fernando.

The Velardeña mine is also in Durango. There is a smelter on this property that smelted an average of 175 tons of ore per day during the year of 1896.

Sonoro, Sinaloa and Guerrero will probably be the greatest producing states.

The west side of the Sierra Madre has a belt rich in gold.

GENERAL NEWS.

THE REDUCTION OF ORES*

BY C. E. DOGARDES, OF SEATTLE.

In treating this subject, it is undertaken with some misgivings, as the scope is broad to place in a small article: to give a clear idea of the proper items. No doubt some readers will miss what to them are important points, but when we stop to consider the vastness of the field and that large volumes are written upon one single process, the indulgent reader is asked to overlook the lacking features.

The use of the metals by man dates into ancient history, and necessarily the separation from the ores has, since their first use, always been a problem. At first it was how to get the metal, now it is how to cheapen the process, either by modification of the present systems or by entering new paths of research.

*Mining in the Pacific Northwest.

In the commercial world the metals are divided into precious and base. There are only three of the precious metals, gold, silver and platinum, while the list of base metals includes the balance, lead, iron, copper, zinc, antimony, etc.

Space will permit only a synopsis as to how gold and silver are separated from the ores. In connection with them lead and copper are of necessity joined. With the copper also come nickel and cobalt.

Gold and silver occur in nature free and combined. The free metal or native is when it is in the form as used in commerce the metallic state, as placer gold or as pieces of "the real stuff" in quartz. In combination they are united chemically with some other element and must undergo a treatment. Gold and silver ores are in general treated alike, as they occur in the same ore and consequently both must be extracted together, although there are some gold ores and some silver ores each having special processes to obtain the value.

Platinum is so extremely rare in ores, the most being obtained from placers and then usually in connection with gold, that its metallurgy will not be dealt with here.

Silver occurs to a limited degree native, but usually in chemical combination, the most common being chloride, bromide, sulphide, telluride, antimonial sulphide (ruby silver and brittle silver), argentiferous galenas and argentiferous gray coppers, all of which must be separated by one of the many processes.

Gold is found as native and in chemical combination with tellurium, called tellurides, which are extremely rich. It is also associated with sulphurets, known as iron pyrite, pyrites, sulphurets and iron sulphurets, being a chemical combination of iron and sulphur. The gold in this case is not chemically combined but mechanically held.

Free gold or free silver ores are treated by a variety of mills, each working with the same end in view, to separate the gold or silver from the rock by amalgamating them with mercury. There is a long list of them, but I shall put them into two divisions. First, stamp mills, which work by a large weight, 500 to 1,000 pounds, called the stamp, dropping rapidly into an enclosed mortar. The pulp, when about the size to pass through a forty-mesh screen, splashes through the screen onto a copper plate, the plate having first been coated with mercury. The gold and silver are held by the mercury, while the balance of the material washes on off the plates. There are gravity stamps, spring stamps and steam stamps. The second division of mills includes all the balance, Huntington, Crawford, Merrill, etc., each differing from the other in the manner of pulverizing the ore, some accomplishing it by large wheels, some by centrifugal revolving weights, others by revolving balls, each having its merits and being adapted for special ores, while the gravity stamps are the most successful with general ores and are usually preferred. The mercury on the plates, when it contains considerable gold is scraped off and placed in a chamois or buckskin sack and squeezed dry, the excess of mercury passing through the chamois. The residue, dry amalgam, consisting of the gold and some mercury, is put in an iron retort, from which the mercury can all be distilled at a low red heat, caught in water and used again, while the retort contains the gold. This is melted in a black lead or clay crucible, run into bricks and is ready for market.

At this point it might be added that there

is quite a mistaken idea of what a mill test is. A mill test is a test made on a sample of ore to see how much free gold it contains and the percentage that can be saved by amalgamating with mercury. A large sample, 100 to 1,000 pounds, is often shipped to a smelter for a mill test. No smelter will smelt a single shipment by itself. The ore is sampled and an assay made, all shipments being treated alike in that respect. The smelters do not test for free gold nor make mill tests, excepting the same as any competent assayer can do in his laboratory.

Few ores occur in which the total value is free gold; part is as a rule associated with the sulphurets. This gold is not caught by the mercury, but is carried off on the plates. In a free gold ore the sulphurets are usually a small percentage of the ore, running from 2 to 30 per cent. When less than 2 per cent, it does not as a rule pay to save them unless quite rich. When above 30 per cent the sulphurets interfere with the amalgamation and there is too great a chance of loss in concentration besides.

To save this value the pulp is carried over concentrators, which are machines arranged for separating by gravity, the use of water and a shaking motion, the heavy mineral from the light gangue—quartz, porphyry, etc.—which is worthless. In handling an ore carrying about ten per cent sulphurets, for every ten tons crushed and run over the concentrators, there will be one ton of concentrates carrying the value. There is always some loss, varying with the nature of the ore; in future treatment there is the cost of working only one ton in place of ten. The concentrates from a gold ore will yield their value by the following methods, pan amalgamation, cyanide, chlorination, bromination, smelting or some of the new processes, the means used to be determined by two points, cost of treatment and percentage of value saved. Some ores take one, others another.

For pan amalgamation the concentrates are thoroughly roasted, then placed in large pans with mercury, stirred and ground until the gold is amalgamated; steam heat is often used, while occasionally salt and bluestone are added, especially when silver is present. The pulp is washed away and the mercury handled the same as when taken from the plates of the stamp mill.

I would state here that no one process, except smelting, will treat all ores, and any process needs some modification for each ore treated. They often treat one ore to perfection and are worthless for another. Ores are individual in character, no two alike.

Chlorination depends upon the fact that gold is soluble in chlorine gas, forming a chloride of gold, acting when the ore is roasted perfectly, but inert on the raw pyrites; roasting is burning off the sulphur, changing the iron from a bisulphide to a sesquioxide, whereby the gold is freed. The roasted pulp is placed in a perfectly airtight chlorination barrel or false bottom vat, moistened and a current of chlorine generated by using salt, sulphuric acid and dioxide of manganese, passed through it. When the action is complete, the gold chloride, being soluble in water, is leached out of the pulp and precipitated with ferrous sulphate. After being allowed to settle, the liquor is drawn off, the gold collected, usually by the filter press, melted and cast into bars.

Bromination is on the same principle, forming bromide of gold instead of the chloride. It is used by a few companies, the claim be-

ing that it is cheaper and simpler than chlorination.

Smelting will be taken up in connection with general ores.

When an ore carries no free metal, the ore as a whole is considered and the best means will depend upon its nature.

Gold and silver are usually associated together, and the ore must be treated to save both metals. When there is no silver of value, the ore is handled the same as the concentrates from the stamp mill. It is concentrated when it will permit. In such cases the ore is pulverized by the stamps or Cornish rolls; rolls seem to be preferred as the product is in a more even and better condition for concentration.

We now come to the treatment of the general ores carrying gold and silver mixed with iron sulphurets, copper sulphurets or galena.

Smelting or matting will handle all ores. But by this means the object in view is only half accomplished; the precious metals do not come out of the furnace pure and ready for use, but are associated with some base metal or carrier, from which they must be separated. The aim in smelting is to make the gangue melt and be thin enough for the valuable metals to collect and settle to the bottom. The ore will not melt by itself without such extreme heat as to endanger loss of value by volatilization, so the proper ingredients are added to obtain a fusion at a moderate temperature; this is called fluxing, the materials added being called fluxes.

Smelting is classified according to the carrier used to collect the gold and silver, being lead smelting, copper matting and iron matting or pyritic. Lead and copper smelting methods merge into each other, for now at many places they are both accomplished in the same furnace at the same time, while on the other hand copper and pyritic smelting pass imperceptibly from one into the other.

Lead smelting or the use of lead as a carrier is the old reliable and today is in most general use. It is the one place where all ores are taken, excepting possibly some high grade copper oxide or carbonates, and they can be handled by other means, although they can be used in small quantities at a time at the lead smelter. It was not many years ago when the lead furnace superintendent would refuse a great many so-called base ores. This term has a different meaning when used in the various branches of mining. A free gold man, in speaking of a base ore, means one from which he cannot extract the gold by mercury. To the smelter foreman it is the ore containing metals which interfere with his saving value. Zinc and antimony are base ores for the lead furnace. Ores which were refused a few years ago are today readily taken. Before long the term base ores will not be in use. There is now a company in the field claiming that by the use of their furnace zinc is an aid instead of a detriment.

(To be Continued.)

DRY GOLD PLACERS

BY PROF. GEO. H. STONE.

Most or all of the dry-placer camps of New Mexico and the rest of the arid region abound in the ruins of machinery, planned by those who never saw a dry placer, and did not know the difficulties to be overcome. Much of this waste of ingenuity could have been prevented had those concerned understood the nature of the dry-placer deposits and the obstacles to success.

In order to have a thorough knowledge of
"Mines and Minerals"

the subject, it is first necessary to study some of the peculiar features of erosion, transportation, and deposition by streams within the arid region. Without this, the mode of occurrence of the gold will remain an unaccountable mystery. Many suppose that the gold bearing gravels of the dry regions were deposited in the same way as in the wet regions. This is a mistake. Most or all of the dry placers were deposited by intermittent rather than by constant streams. This makes the nature of the dry-placer deposits essentially different from that of the placer gravels of the wet regions. Rules of prospecting derived from a region of constant streams are a hindrance in prospecting the dry placers.

All of the following stated facts I have myself observed in the field, and most of them have not before been published within my knowledge.

Erosion and Deposition in the Arid Regions.

—The preliminary processes of erosion, fracturing of the rocks by joints and changes of temperature, chemical decomposition by atmospheric agencies, and all the other complex changes included under the general term weathering—go on in the arid region much as they do elsewhere. The rock disintegrates and forms thick sheets of a talus of fragments that cover the more gradual slopes. All are on the way to the sea. Much of the finer matter is carried away by the winds, but most of the transportation is by rains and melting snows. Erosion is quite rapid in the arid region for two reasons: First, the soil is little protected by vegetation; second, the rains are generally violent while they last. One "cloudburst" may erode and carry away more debris than a quarter of a century of moderate rains. The rapidity of erosion from the mountains is well shown near San Pedro, New Mexico. Here, near the base of the mountains, are pine trees two to three feet in diameter, whose roots have been buried with drifts from the mountains. Lumbermen familiar with the pines of that region all declare that the branches found near the present surface of the ground are such as only grow near the tops of the trees, and that since these trees began to grow, at least fifty feet of wash must have been deposited around their trunks.

A section across the sediments deposited by streams in the arid region shows a rude stratification. At one place we will find a boulder bed where a big flood swept away all the finer material during the height of the flood, and then covered the boulders with gravel and sand during the subsidence. On this coarser stratum will be found layers of clayey sediment, such as are deposited during ordinary light rains. The water drift of the arid region thus preserves a record of past climates, extending in some cases over whole geologic epochs. This drift is a curious mixture of the finest and the coarsest, such as could not have been deposited by constant streams. It could only originate in a region where the streams rise rapidly and fall as rapidly. The deposits left by each flood are sometimes distinct from all the rest, but often the violent floods wash away part of the older deposits, and thus mix the sediments.

A most remarkable means of thus mixing the sediments of different floods is the result of the fact that most places in the valleys and lowlands are alternately areas of erosion and deposition. In and near the mountains we find many valleys having moderate slopes and grassy or prairie-like surfaces. One of these is known as a "draw."

Often, for some slight cause (an animal's

track perhaps the proud sod of the draw becomes broken. The next hard rain causes a little waterfall at this point and quite a hole is soon formed which the rains leave full of water. Formerly the buffaloes wallowed in these and they were known as "buffalo willows." The tramping of the animals broke down the banks and destroyed the waterfall and thus prevented them from enlarging very much. But if left to its natural development a hole once formed in the sod tends to prolong itself into a ravine or canyon. The agency of the erosion is the force of the water joining over the cliff of erosion. This forms a pot hole at the base of the waterfall. The boiling motion of the water within this hole rapidly undermines the cliff. As the cliff recedes up the valley it leaves behind it a channel with vertical sides, generally known as a 'wash'. I have known such a wash prolong itself up the valley nearly a quarter of a mile in a single storm. Washes are of all sizes up to a hundred feet in breadth and depth and up to several miles in length. The depth is often greater than the breadth.

In the drift from the mountains we often find boulders up to ten feet in diameter, at a distance of ten to twenty miles from the mountains. Eastern geologists have often attributed this transportation to glaciers, on the ground that only glaciers could transport so large boulders over slopes of only 80 to 100 feet per mile. But let our tenderfoot geologist get acclimated by being out in a few mountain hailstorms, of the variety known as the 'cloud burst,' let him see these washes running bankful with the speed of a horse, let him hear the roar and anvil chorus of the boulders as they speed past him and crash against each other, and he will agree that the hypothesis of glaciers is needless to account for the transportation of boulders on broad prairies sloping down from the mountains. Nature has provided a way for taking a stream that would be on the open prairie a half mile wide or so and a foot or two deep, consequently with little transporting power, and confining it in a narrow coule where it has a tremendous power to transport even large boulders. I have known a boulder twelve feet in diameter carried near half a mile through the town of Manitou during a single storm. No one can understand anything of the processes of erosion and deposition in the arid region without understanding the "wash" and its work. It is the natural construction of which the placer miner's sluice is a feeble imitation.

When a wash is once formed it prolongs itself up the valley until the valley slope becomes more gradual, or the drift becomes coarse, or vegetation intervenes. When for these or any other reasons, the waterfall is destroyed, the further progress of the wash is arrested. In the arid region even great floods rush over gradual slopes without much eroding the underlying soil. The rush of water is over before the hard underlying earth can become wet and softened more than a few inches.

When the wash ceases to prolong itself, there follows a period of deposition in the channel which so recently was the scene of such active erosion. The vertical walls of the wash slowly crumble. The lateral slopes become more gradual and recede toward the sides of the valley. The wash is slowly filled with debris from the materials of the valley and from the mountains. In the course of twenty to fifty years, the ravine will have become filled to a level with the surrounding prairie. Our valley has now become a draw.

again. One can then pass over the smooth prairie and never suspect that twenty or forty feet below him is the bed of an old wash. In the course of years another wash will form in this part of the valley. Its course will probably be to one side of the former. Thus, in each region of deposition we may have the beds of numerous washes at various levels in the sediments.

This interesting cycle of events—first the wash and then the draw—is constantly being illustrated in most of the valleys and prairies near the mountains. First erosion and then deposition is most active, often as the result of changing climate. When carefully studied, no doubt the dry-placer deposits will reveal much of the climatic history of that region.

In the dry places we sometimes find the pay streaks at or near true bedrock, usually resting on layers of cement that form false bedrocks. The gold occurs in narrow streaks of limited depth and length. They are of very irregular occurrence and have to be hunted for. There is no known way to predict where they will be found. The gold came down during the more violent floods. Sometimes the gold appears in larger sheets, as it deposited by a great flood during the draw stage. But more often the pay streaks are so narrow and crooked we can only conclude they formed in the bed of ancient washes. In some places the successive washes were pushed from the side having the steeper or higher slopes and contributing most drift over toward the side of the valley contributing least drift. In such cases we can predict that the oldest channels will be found deeply buried and on the side of the valley having the steeper and higher slopes.

to be continued

Latest Mining Decisions.

Prepared by Andrews & Murdoch, Berrien Springs, Mich.

A valid agreement definite and fair and reasonable in its terms, was made for the lease of a tract of coal land, to be mined by the lessee. The lease would necessarily extend through a number of years. The quantity to be mined each year was uncertain, and payment of a royalty was to be made to the owner according to a sliding scale, varying from year to year. Owing to a known fault in the vein, but the extent of which was unknown, the total quantity of coal to be mined was very largely a matter of uncertainty.

Held, that specific performance of the agreement would be decreed as a suit of the lessee, on the ground of the inadequacy of his remedy at law for non-performance, arising from the impossibility of determining the amount of his damages with any reasonable degree of certainty. *Oakford vs. Hackett*, 92 Fed. Rep. (U. S.) 38

PERSONAL NEWS ITEMS

GAIL BORDEN, of the Colorado and California Mineral Development Co., of Los Angeles, Cal., has just left on a visit to New York City and other Eastern points.

F. G. MAYSAH, formerly the assayer of Needles, Cal., and later on assistant in L. & E. ARMSTRONG'S Precious Metal Assay Office at 115 W. Fifth street, Los Angeles, Cal., is now helping R. A. PIERCE, L. M., manager of the Bi-Metallic Assay Office at 124 S. Main street, Los Angeles, Cal., who is working a force of metal purgers day and night. Mr. MAYSAH says he was compelled to close his Needles office on account of the rates for assaying established by the University of Arizona at Tucson, no the west Arizona being his principal source of revenue.

B-1. When λ_1 or λ_2 are odd integers, $(\lambda_1 + \lambda_2)$ can be even or odd depending on whether λ_1 and λ_2 are both odd or both even. Hence,

which, he stated, was false.

U.S. Environmental Protection Agency
 as Secretary of the Department of the Interior
 March 1970

Charles Herbert, representative of the department of the Interior of the State of New York, U. S. District Court, Southern District. He will remain in the city until Saturday, and go to Republic, Wash.

H. D. M. L. S. v. O. (questioning) and
ing syndicate (in S. v. O. case) (1911)
to make a tour of the department.

J. J. Franco, of the University, is
Mexico.

ALEX SWAN, who is working the L. L. L. up on the island, is a Hotel Merit. He is bringing news of that camp.

JOSEPH SETHLER, one of the fathers of the oil country, has resigned to accept a position as a lecturer and from Rusk, Texas. He will continue his efforts to develop oil, several properties on the Rusk Range. It is also reported that he will be continuing his branch of the American Steel and Wire

LEW L. ARNOLD, M.D., the medical director and allergist and assistant to Dr. A. George Kohn, has been looking over properties in Placer, Sacramento, and Colusa counties, Calif., for eastern capitalists.

LARRY BROOKS, a mining man in Denver, is in San Francisco, Cal.

HERMAN RICHARDS, a well-known citizen of Omaha, Neb., is in custody of the state penitentiary of machinery for the new drive shafting process for the 100 stamp mill at the old Leavenworth camp, west of Custer.

A good firm in Zacatecas, Mexico, desires to engage a good assayer and chemist. Further information furnished upon application to the Editor.

The Machinery & Electrical Co. of Los Angeles, Cal., have recently secured the agency for sale of the Improved Wonder Pump, manufactured by the Wonder Pump Mfg. Co. of Berkeley, Cal.

OBITUARY.

Wm B. Morrison, general manager of the Iron & Steel Co. of Big Bend, N. M., who recently passed away, was a native of this section, of character and ability in the handling of the company's affairs.

THE MARKETS.

All quotations, financial reports and other statistical figures given under the head are New York prices unless otherwise stated. The quotations are subject to change without notice, and are not to be taken as a basis for statistical matter.

New York, March 14, 1899
The following are the Silver, Copper and Lead quotations for the last two weeks

	SILVER	COPPER	LEAD
April 16	89 1/2	18 1/2	10 1/2
" 17	89 1/2	18 1/2	10 1/2
" 18	89 1/2	18 1/2	10 1/2
" 19	89 1/2	18 1/2	10 1/2
" 20	89 1/2	18 1/2	10 1/2
" 21	89 1/2	18 1/2	10 1/2
" 22	89 1/2	18 1/2	10 1/2
" 23	89 1/2	18 1/2	10 1/2
" 24	89 1/2	18 1/2	10 1/2
" 25	89 1/2	18 1/2	10 1/2
" 26	89 1/2	18 1/2	10 1/2
" 27	89 1/2	18 1/2	10 1/2
" 28	89 1/2	18 1/2	10 1/2
" 29	89 1/2	18 1/2	10 1/2
" 30	89 1/2	18 1/2	10 1/2

The silver market has remained steady and dull this week, but closes with firmer tendency on the prospect of French tenders next week.

The small amount of dollars received in the first quarter of this year is noteworthy. It is known that the China market is not in favor of a movement this way and the holders in Mexico have been able to do better at home than by shipping to China. There has been a large increase in both gold and silver bullion.

COPPER.

Copper continues in good demand. Lake, which it is difficult to get for prompt delivery has improved in value, it is said that as high as 19c has been offered. June, July and August, however is quoted at 18c. Prices for electrolytic copper remain unchanged at 17 cts. For cakes, wirebars or ingots and cath-

odes to be used in copper is common at 16 1/2 and 17c.

LEAD.

Lead remains dull. There is as yet no improvement in the demand as the policy of the American Smelting & Refining Co. becomes clearly defined. In the meantime consumers appear to be inclined to await developments. We quote Lead at \$1.30. The foreign market is still firm at \$1.14 10s for Spanish, and \$1.14.12s 6d for English.

SPELTER.

Spelter remains firm at \$4.00@4.25 St. Louis, and \$6.50@6.60 New York. The foreign market is very steady, the latest quotations received quote spelter at \$27 18s.9d. for ordinaries and \$28 3s. 9d. for specials.

ANTIMONY.

The prices for Antimony remain unchanged at 10@10 1/2c for Cookson's, 9 1/2c for Hallett's, C. U. S. Star and Hungarians.

NICKEL.

Nickel continues unchanged and no alternation of prices can be reported. We quote for ton lots 33@36c per lb., and for smaller orders 35 1/2@38c. London prices are 14@16d. per lb., according to size of order.

TIN.

The fluctuations of the market have been very wide going as high 25 1/2c, and as low as 24 1/2c, but at last report the values have again improved the closing price being about 26c. The foreign market closed at £113 for spot and £113.12s 6d. for three months.

PLATINUM.

The demand for Platinum is active and prices continue high. We quote for New York \$15.50 per ounce for large lots and \$16@17 for small orders; London is 62 @ 54 can ounce.

Purified, 99.99 per cent., in cases of 120 lb. at 32c. per lb. in 5, 10, 20 and 40 lb tins at an advance.

QUICKSILVER.

New York price remains at \$42 per flask. The London price is £8 5s. with £8 1s. 3d named for second hands.

POWDER.

F. o. b., San Francisco: No. 1, 70 per cent. nitro-glycerine per lb. in carload lots, 15 1/4c; less than one ton, 17 1/4c. No. 1, 60 per cent., carload lots, 13 1/2c; less than one ton, 15 1/2c. No. 1, 50 percent carload lots, 11 1/4c; less than one ton, 13 1/4c. No. 2, 40 per cent., carload lots, 10c; less than one ton, 12c. No. 2, 30 percent carload lots, 9 1/2c; less than one ton, 11 1/2c. No. 2, 20 percent, carload lots, 9c; less than one ton, 11c. Black blasting powder in carload lots, minimum car, 728 kegs, \$1.50 per keg; less car lots, \$2 per keg.

COKE.

But little change, if any, is noticeable in the condition of the coke trade, which is quite steady and featureless otherwise.

IN CAR LOTS, ST. LOUIS.

Connellsville 60 coke 72-hr. fry. \$4.85
New River \$4.00 Pocahontas \$4.85
Crushed \$4.00
Gas works coke, lump, per bushel 10

BORAX.

The San Francisco market in Borax is firm with a good demand.

The market is quoted as follows:
Refined, in carload lots, in barrels 7 1/2
Refined, in carload lots in sacks 7 1/2
Powdered, in car lots 7 1/2
Concentrated, in car lots 6 1/2

THE MINOR METALS.

Quotations are given below for New York delivery:
Aluminum.
No. 1, 99 per cent. ingots, per lb. 31 1/2c
No. 2, 90 " " " 31 1/4c
Rolled sheets, per lb. 31c up

Bismuth, per lb. 1 1/2
Phosphorus, per lb. 1 1/2
Fungus, per lb. 1 1/2
Variations in price according to the size of the order

CHEMICALS

A good and steady demand is shown and prices are firm. Imports have been light, while receipts of domestic goods included 574 bbls., and 1,115 sacks of soda ash, and 77 casks of potash.

CAUSTIC SODA.

Quotations for caustic soda, domestic, high test, \$1.37 1/2@1.42 1/2 per 100 lbs f. o. b. at works \$1.50@1.55 delivered.

ALKALI.

Domestic 60% f. o. b. works; 70% \$1.75@1.80 delivered; foreign, \$1.60@1.70

CARBONATED SODA ASH.

78 per cent., 90c and 95c. per 100 lbs. basis 48 per cent.

BI-CARBONATE OF SODA.

American, \$1.12 1/2 @ \$1.25; English, \$2.12 1/2 @ \$2.25 per 100 lbs. according to brand and style of package.

SAL-SODA.

For domestic 50c. per 100 lbs., less the usual discounts; English, 60@62 1/2c per 100 lbs. Concentrated sal-soda, \$1.60 @ \$1.70 per 100 lbs.

CHLORATE OF POTASH.

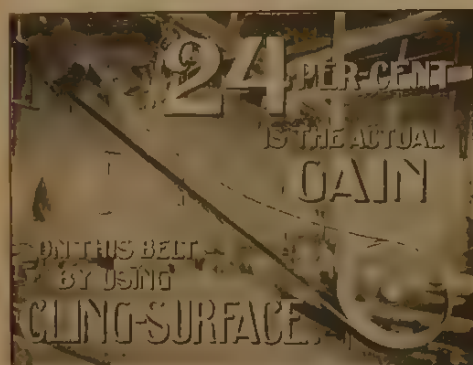
Chlorate of potash is quoted at \$1.00 @ \$9.25 for crystals and \$9.25 @ \$9.50 for powdered per 100 lbs.

CHLORIDE OF LIME.

English prime brands \$1.60@1.70, American, \$1.70@1.80; Continental F., \$1.50@1.60 per 100 lbs.

ACIDS.

Consumption is satisfactory and deliveries on contract are moving more



BELTS WILL SLIP - BUT

CLING-SURFACE

WILL STOP IT PERMANENTLY.

CLING-SURFACE is to be applied to the inside of a belt.

It has been so universally satisfactory for the past three years that we can safely guarantee that its use will not only stop all slipping, but that the belts will become soft and pliable, yet firm; if of leather, they will become as soft as cat skin, and also absolutely water-proof; and furthermore we guarantee that the belts can be run slack, and that the power will be increased so much that in a fair-sized plant the cost of the sample can will be earned monthly.

This applies to all belts, leather, cotton, rubber or a rope drive, whether new, old, or oily. We will send you a sample can for trial; or, if you prefer, we will advise you further as to its nature.

CLING-SURFACE MFG. CO., 167-172 VIRGINIA ST., BUFFALO, N. Y.

REPRESENTED IN SALT LAKE BY THE UTAH RUBBER & MFG. CO.

A Practical Test ...

We asked a man the other day what he thought of our pumps.

"Well," said he, "I've used this pump for twenty years, and it's better than most pumps yet."

The best material, workmanship and patented construction—that's why our pumps wear.

Are you going to buy—Write us for full information and catalogue. All free for the asking.

W. T. GARRATT & CO.,
Pump, Bell, Brass and Machine Works,
138-142 Fremont St., San Francisco, Cal.

MINERALS WANTED



Gold and Silver Quartz Specimens, Crystals, Opals, Turquoise, etc., etc.

Buy in Any Quantities Pay good prices—Cash

E. C. MOLLER,

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NEW YORK



The Pulsometer Steam Pump

"THE MINER'S FRIEND"

Often Imitated—Never Equalled

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RECENT IMPORTANT IMPROVEMENTS

The Handiest, Simplest and Most Efficient Steam Pump for General Mining, Quarrying, Railroad, Irrigation, Drainage, Coal Washing, Tank-filling and for Pumping Back Liquids heavily impregnated with sediment. Muddy or gritty liquids handled without injury to the Pump.

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San Francisco, Cal. Helena, Mont. Portland, Oregon.

CATALOGUE ON APPLICATION
CORRESPONDENCE SOLICITED

Pulsometer Steam Pump Co.

133 Greenwich Street, New York City

easily. The blue vitrol export demand continues good, while prices are practically unchanged.

IRIMSTONE

More arrivals are noted at this port, but the 2,000 tons at hand have all been contracted for and will go into consumption. Spot best unmixed secured are therefore unchanged at \$22@22.50 per ton, shipments \$21.50@22. Thirds are about \$2 less.

NITRATE OF SODA.

The spot market is firmer at \$1.66@1.67½ per 100 lbs., owing to the very few arrivals of cargoes.

FINANCIAL NOTES.

Average Prices of Metals

in New York per pound from January 1, 1890:

Month	Copper	Tin	Lead	Spelter
January	11 5/8	1.18	5.34	
February	12 1/4	1.40	5.28	
March	12 1/4	1.37	6.31	
April				
May				
June				
July				
August				
September				
October				
November				
December				
Average				

Average Monthly Prices of Silver.

in New York per ounce Troy, from January 1st, 1890, and for the years 1898 and 1897:

Month	1898	1897	1897
	Cents.	Cents.	Cents.
January	59.36	64.79	
February	59.42	64.67	
March	59.91	64.00	
April		61.85	
May		60.12	
June		60.10	
July		59.61	
August		59.51	
September		60.68	
October		60.12	
November		59.91	
December		59.42	
Year		59.26	59.79

The statement of the United States Treasury, on Thursday, April 12th, shows balances in excess of outstanding certificates as below, comparison being made with the statement for the corresponding date last week:

	April 12.	Changes.
Gold	\$245,263,450	D. \$ 161,78
Silver	4,018,623	D. 213,581
Legal Tenders	14,705,495	I. 192,922
Treas'y Notes, etc.	840,761	I. 93,591

Totals \$264,337,339 D. \$ 88,857

Treasury deposits with national banks amounted to \$89,427,900, an increase of \$6,319,075 during this week.

Gold and Silver Exports and Imports.

At all United States ports, February 1899, and year from January 1st, 1898 and 1899:

	FEBRUARY	
Gold—	1898	1899
Exports	\$1,030,412	\$ 21,94
Imports	\$6,162,681	5,111,000
Excess	I. \$5,132,269	I. 4,824,066
Silver—		
Exports	\$3,759,971	\$4,562,195
Imports	2,085,635	1,427,027
Excess	E. \$1,674,336	E. \$3,135,169

This statement includes the exports and imports at all United States ports, the figures being furnished by the Bureau of Statistics of the Treasury Department.

* WANTS *

Advertisements of this class containing not more than five lines will be inserted for not exceeding three months in any year, free of charge, to all paid-up annual subscribers. Other than above \$1.00 per month. Advertisements not accepted for less than one month.

COPPER MINE. State full particulars in regard to development work location, distance from water, price of fuel, character of ore and returns from shipments. Must have at least 1500 feet of development work. Send all information possible. Address,

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Care JOURNAL Office,
150 Nassau St., New York, N. Y.

GOLD mine anywhere in *United States*, must have at least 1000 feet of *development*; where coal is *not over \$6.00 per ton* or wood \$4.00 per cord *delivered*; plenty of *water*; no objection to *low grade ore* if profit can be made by having *large plant* to *amalgamate* and *concentrate*; want 6 months *working bond*; no *property* considered unless *owners* are prepared to deposit *certified check* to be forfeited for expenses of *engineer* if *property* is not *as represented*. Address with *price and full particulars*,

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EXPERIENCED Assayer and Cyanide operator desires engagement. The successful and economical treatment of silvery ore or tailings by cyanide a specialty.

Address W. V. WATSON,
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METALLURGIST and Chemist, ten years experience, assaying, ore buying and smelting, at present engaged with large pyrite smelting company in Mexico, desires engagement in the States or British Columbia. Address: "W. H. C." JOURNAL Office.

EXPERIENCED man desires position, who can install, run and keep in repair, Steam, Electrical and Mining machinery, has knowledge of assaying and office work. References. Address—

W. H. K., McCloud, Cal.

FOR SALE I

TWO-THIRDS interest in well-developed gold mine in Dona Ana County, N. M. See Ad. page 21.

A GROUP of 4 Copper claims in Northern Arizona. By-product of gold and silver, recently discovered and show great promise will sell at a great bargain.

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DAILY AD.

REMAIN Two Stamp Steam Mill at Tucson, Arizona. 15-H. P. Boiler Pump and every thing complete, set up ready for work. In excellent condition, used less than six months. Address DREDGING MINING MACHINERY CO., Kansas City, Mo.

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A VERY valuable, extensive Lead Mining Property in Southwest Virginia. Shaft sunk over 200 feet and actual work has demonstrated richness of veins and purity of ore. Address—

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See Incorporated Mines Paying Dividends Page 22

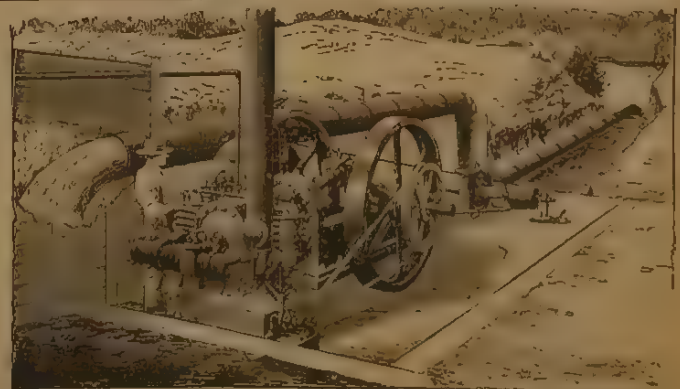
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Hale Co.	35	Standard	1 75
Homestake	.60 60	Union Con	65
Iron Silver	68	Utah	10
Justice	08	Yellow Jacket	92

BOSTON		
Adventure	14	87 1/2
Allouez	9	87 1/2
Alcadian	69	75
Arnold	35	80
Atlantic	37	60
Battle	39	60
Bunanza	1	87 1/2
Boston & Montpelier	1	87 1/2
Battle & Boston	80	60
Calumet & Hecla	85	60
Centennial	40	60
Cochiti	15	60
Concord	16	60
Concord	27	60
Concord	36	60
Concord	2	50

Andie	04	Novelty	05
Brand's Gold Crk	15	London B.C. G	00
Big Three	15	Fl. R.	70
Big Amer. Car	15	New G'd' Hall, C	05
Blue	04	Novelty	05
Blue Col. Car	05	Queen Head Prop	00
Canada Gold Fields	10	Rambler Con	00
Caribbean	15	Red Mount, View	
Deer Park			
Dunder			
Keeney Star	36	Silver Bell	1 00
Fein		Sarah Lee,	
Georgia	02	Silverline	25
Gold Fields of B C	00	Silver Queen	15
Halt		St. Elm	
Hallie Brown		St. John	2 45
Hall Mines	3 75	St. Mary De. Co	00
High Ore	02	W. M. M. M. M.	3 00
High Wake	00	W. M. M. M.	
Iron Map	00	W. M. M. M.	3 00
Kenneth		W. M. M. M.	00

Alta Con	12	Mexican	70
Andes	17	Occidental	52
Belcher	40	Ophir	10
Best & Belcher	57	Overman	120
Bullion	10	Ontario	350
Caladonia	40	Pomona	08
Challenge	13	Potosi	30
Chollar	35	Quicksilver	125
Confidence	90	Quicksilver prod	400
Con. Cal & Va	195	Savage	38
Crown Point	30	Sig. Belcher	30
Deadwood	45	Sierra Nevada	16
Gould & Curry	43	Silver Hill	

Hale Co.	35	Standard	1 75
Homestake	.60 60	Union Con	65
Iron Silver	68	Utah	10
Justice	08	Yellow Jacket	92

Genia	584 Inhabella	451
Alamo	767 Jack Pot	363
American Con	54 Little	58
Anconda	64 Kimberly	08
Argentine Juniate	102 Mineral Rock	59
Bacon	01 Motor	10
Bob Lee	027 Mineral Rock	10
Creede & C	73 Mountain Beauty	75
De la Motte	116 Mollie Gibson	38
Elkton	103 Moon-Archer	02
Elkton Con	91 Mount Rosa	25
El Paso	20 New Haven	02
Emma Albee	605 Oriole	07
Florida	103 Oregon Bell	07
Florida	044 Peoples	14
Hendley	144 Pharmacist	05
Place of the West	021 Pilgrim C	05
La Grange	32 Portland	15
La Grange	22 Pr. Albert	05
Gold & L. L. L.	654 Rattler	08
Gold King	81 Specimen	08
Gold	10 Theresia	87
Golden Hill	104 Treachery	08
Hayden	113 Union Gold	20
Ingham Con	075 Work	18

Alice	30	Joe Bowers	77
Ajax	143	14 Helne	60
Alliance	20	Little Pittsburg	78
Anchor	85	Lower Mammoth	78
Buckeye	40	Malvern	10
Hullion Beck	535	Mammoth	189
Coal Kurat	48	Marcus	70
Chloride Point	33	Morgan	05
Dalay	283	Northern Light	38
Dalton	02	Omaha	38
Dalton & Lark	11	Ontario	729
Daly	20	Rich. Anacanda	78
Daly West	10
Deater	225	Sacramento	67
Engle	08	Shower Con	414
Engle & Blue Bell	100	Silver King	3500
Four Aces	40	Six Consolidated	108
.....	41	Silverman	19
Gemin	Sunshine
Geyser-Marion	75	Swansea	380
Golden Eagle	06	Ho Swansea	125
Grand Central	7	10 Tetro	07
Homestake	11	Utah	50
.....	20
Ingot	20	West Mt'n Pflger	82
Joe Bowers	17	Wynp America

Adams Coat	30	Horn Silver	140
Alamo	10	Jabella	10
Alice	10	Jen Silver	80
Alfonse	10	Jefferson	80
Alfonse & Gold	54	Jessie Blanche	80
Anchur L	25	Jessie	80
Argentine Junata	27	King & Pemb	10
Belcher	40	Leadville Cons	10
Best & Belcher	71	Little Chief	10
Black Gold	10	Madison	80
Breece	1	Moile Gibson	80
Brunswick	175	Mr Ross	30
Chollar	15	Ontario	60
Chrysolite	16	Opbir	10
Columbia Tunnel	10	Pharmacist	80
Columbia	10	Pickens	80
Columbia & S	230	Plymouth	10
Columbia & S	230	Portland	10
Columbia & S	230	Potosi	92
Columbia & S	230	Quicksilver	10
Columbia & S	230	Quicksilver pld	10
Cripple Creek Cons	89	Rocky Mountain	10
Deadwood	70	San Juan Star	33
Rikton Cons	85	Savages	30
Enterprise	25	Sierra Nevada	10
Garfield Cons	12	Small Hope	10
Gold & Silver Crk	2	Standard	50
Gold & Silver Crk	2	Union Cons	50
Gold & Silver Crk	2	Union	20
Gold & Silver Crk	2	Utah Cons	10
Gregory Gold	68	Waldorf	10
Hale & Narcross	36	Work	10
Hill Flite	10	Yellow Jacket	20
Homesake	55		

Dee Hart	70	Palm Atte	12
Dee's Tau	22	Leal	12
Bryan and Newall	15	Prachontas	14
Battle and Boston	115	Princhers Maude	05
Kardman	67	Quelp	05
Kate's First Th	10	Reber	3
Kureka Queen	10	Republic	3 45
Golden Harvest	05	Republic Big Six	05
Gold Leaf.....	05	Republic No. 2	05
Jim Haine	05	San Poff	05
Larry	04	Surprise	11
Long Pine Cones	10	The Iron Monitor	35
Merriam.....	00	Thoughtful	02
Monroe	00	Tom Thumb	32
Morning Glory	20	Trade Dollar	12
Mountain Lion	85	Treasury	12

Aetna	004	Keystone,	08
Anchovia Leland	80	Lullie	—
Anacosta	54	Maton	38
Arcadia	03	Mollie Gibson	25
Argentum Junata	30	Maon Anchor	1 13
Runner		Mt Rosa,	25

Bob Lee	..	98	Gold Gold	\$1
El Paso B.	..	5	" "	
Enterprise	..	60	Pilgrim C.	DG
Fanny R	...	97	Pine Creek	1
Gardfield Grange	..	12	Portland	1
Geo. Washington	...	12	Prince Albert	
Golden Eagle	..	003	Republic	
Gold Coin	..	40	Sacramento	
Olympic & C....	..	2 00	Smuggler	
Globe Co.	..	45	Spokane	
Golden Plover	..	00	Tumtrack	
Isabella	..	33	Union Gold	
Iron Clad	..	854	Virginia M	
Jack Pot	..	83	Wheel & Parting	00
	..	00	Work	

Name of Company	State	Price
Amistad y Concordia.	Hidalgo	20
Angelitas	Guangajuato	20
Atrevido y Anexas.	Hidalgo	20
Atrevidas y Anexas	Zacatecas	10
Barradon y Cabras	Durango	10
Bartolome de Medina	Hidalgo	9
Cabrason y An.	Zacatecas.	9
Candelaria de Pinos		9
Capisayas...	Durango.....	50
Carmen	Hidalgo	50
Cinco Senores y An	Guangajuato	10
Compecon y Anexas	S. Luis Potosi	10
El Oro		10
Hapamasa y An.	Mexico	1 75
Gloria.	Chihuahua	9
Guadalupe	Guangajuato	25
Luz de Florida	Michoacan	25
Luz de Maravillas	Hidalgo	25
Pabellon.		25
Palma	Zacatecas...	25
Rafael y An.	Hidalgo	10
Real del Monte	Hidalgo	10
Restauradora.	Durango	3
Rioasen y Anexas	Durango	10
San Francisco	Hidalgo	25
San Rafael del Oro	Hidalgo	25
San. Maria de la Paz	S. Luis Potosi	75
Soledad.	Hidalgo	25

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Pamphlet No. .00

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Mines at Victor, Colorado)
CORPORATED IN COLORADO
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Gentlemen:—We bought two years ago one of the largest
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This was found to be too small for our needs about a year
ago and we purchased of you a Duplex Corliss machine
16" x 19 $\frac{1}{2}$ " x 42".
This was set in place in our shaft house in theripple Creek
mine, to cut feet above the level of the sea, and has been
running continuously ever since, and at times over ten ft.
per hour.
The steam cylinders were connected to an in-
dependent Jet Condenser, for which we are using the mine
water, and the resultant economy of operation is very
noticeable.
The operation of this Compressor is as near perfect as
that of any machine we have ever seen, and this type is well
worth the extra cost on account of the great permanent
economy in operation.
Our mine is equipped exclusively with your drills and we
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Yours very truly,
The Portland Gold Mines Co.,
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See Incorporated Mines Paying Dividends Page 22

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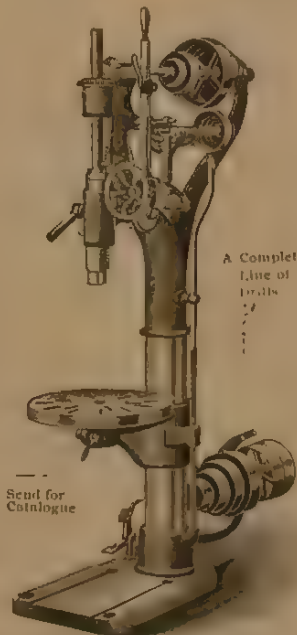
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taken out concentrated 150 to the ton while
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thirds and the other one third. The owner of
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ling interest, and arrangements can be made for
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NAMES OF MINES	LOCATION	No. of Shares	Capital Stock	Par Value	Amount Paid (Per Share)	Date of Last Dividend	Total Amount Paid (Per Share)	Kind of Mines
1 Adira Cona	California	100,000	\$ 500,000	\$ 5	\$ 10	Jan 1898	\$ 100,000	G
2 Alaska, Peardwell	Alaska	200,000	5,000,000	25	37 1/2	Jan 1898	3,000,000	G
3 Alaska Mexican	Alaska	200,000	1,000,000	5	10	Jan 1898	335,000	G
4 Alice	Montana	400,000	10,000,000	25	05	April 1898	1,077,000	G, S, L
5 Anacoda	Montana	1,200,000	30,000,000	25	1 25	Nov 1898	2,000,000	G
6 Anchorage Island	Colorado	600,000	600,000	1	03	Jan 1898	192,000	G
7 American Gold	Colorado	300,000	3,000,000	10	09	Oct 1898	302,000	G, S, L
8 Associated	Colorado	1,250,000	1,250,000	1	01	Dec 1898	72,000	G
9 Aurora	Michigan	100,000	2,500,000	25	50	May 1898	750,000	G
10 Bald Butte	Montana	250,000	250,000	1	06	Dec 1898	639,618	G, S, L
11 Big Six	Colorado	500,000	500,000	1	00 1/2	May 1898	1,000	G, S
12 Boston and Colorado Smelting	Colorado	15,000	750,000	50	5 00	Jan 1899	300,000	G
13 Boston & Montana	Montana	150,000	3,750,000	25	5 00	Feb 1899	9,575,000	G, S, L
14 Brevo	Colorado	200,000	5,000,000	25	05	Mar 1899	30,000	G
15 Bu lion Beck and Champion	Utah	100,000	1,000,000	10	10	Feb 1899	2,500,000	G, S
16 Bunker Hill and Sullivan	Idaho	300,000	3,000,000	10	07	Feb 1899	612,000	S, L
17 Carbo	British Col	800,000	800,000	1	02	Aug 1898	238,965	G
18 Calumet & Hecla	Michigan	10,000	2,500,000	25	10 00	Mar 1899	860,000	G
19 Centennial Joreka	Utah	30,000	1,500,000	50	50	Feb 1899	2,500,000	S, L
20 Central Lead	Missouri	10,000	1,000,000	100	50	Feb 1899	92,000	L
21 Champion	California	34,000	340,000	10	25	April 1898	205,200	G
22 Charleston	S. Carolina	10,000	1,000,000	100	1 50	Dec 1898	180,000	G
23 Colorado Smelting	Montana	100,000	1,000,000	10	1 00	Jan 1899	1,915,000	G, S, L
24 Consolidated Tiger and Pootman	Idaho	1,000,000	1,000,000	1	02	Dec 1898	20,000	G, S
25 Creston Leasing	Colorado	1,000,000	1,000,000	1	01	Dec 1898	51,000	G
26 Crowned King	Arizona	600,000	6,000,000	10	02	Dec 1898	232,000	G, S, L
27 Deadwood Terra	S. Dakota	200,000	5,000,000	25	05	May 1898	1,350,000	G
28 De Lamar	Idaho	400,000	2,000,000	5	29	May 1898	2,451,600	S, L
29 Doe Run	Missouri	5,000	5,000,000	100	50	Feb 1899	65,000	L
30 Elkon Consolidated	Colorado	1,250,000	1,250,000	1	01 1/2	Nov 1898	658,961	G, S
31 Empire State	Idaho	75,000	750,000	10	10	Feb 1899	10,133	G
32 Enterprise	Colorado	500,000	500,000	1	05	Sept 1898	900,000	S, L
33 Geyser-Marion	Utah	300,000	1,500,000	5	02	Sept 1898	90,000	G
34 Gold Coin of Victor	Colorado	1,000,000	1,000,000	1	01	Mar 1899	180,000	G
35 Gold King	Colorado	1,000,000	1,000,000	1	01	Feb 1899	10,000	G
36 Golden Cycle	Colorado	200,000	1,000,000	5	02 1/2	Mar 1899	168,500	G
37 Golden Reward	S. Dakota	1,000,000	1,000,000	15	15	Feb 1898	155,000	G
38 Grand Central	Utah	250,000	250,000	1	12 1/2	April 1899	356,250	G, S, C, L
39 Hals Mines Ltd.	British Col	250,000	1,250,000	5	25	May 1898	160,000	G
40 Highland	S. Dakota	100,000	10,000,000	100	20	Mar 1899	3,844,718	G
41 Holy Terror	S. Dakota	300,000	300,000	1	03	Sept 1898	117,000	G
42 Homestake	S. Dakota	125,000	12,500,000	100	50	Feb 1899	7,806,250	G
43 Hope	Montana	100,000	1,000,000	10	10	Mar 1898	762,252	S
44 Horn Silver	Utah	400,000	10,000,000	25	05	April 1899	5,260,000	S, L
45 Idaho	British Col	500,000	500,000	1	05 1/2	Jan 1899	262,000	G
46 Iowa	Colorado	1,000,000	1,000,000	1	00 1/2	June 1898	90,000	G
47 Iron Mountain	Montana	500,000	5,000,000	10	02	Apr 1898	507,500	S
48 Isabella	Colorado	2,250,000	2,250,000	1	06	Feb 1899	405,000	G
49 Jersey Leasing	Colorado	200,000	200,000	1	03 1/2	Oct 1898	137,875	G
50 Le Roi	British Col	500,000	2,500,000	5	10	Apr 1898	775,000	G
51 Lillie	Colorado	1,000,000	1,000,000	1	05	Feb 1899	190,000	G
52 Minnesota	Minnesota	165,000	16,500,000	100	1 50	Oct 1898	4,735,000	L
53 Modoc	Colorado	500,000	500,000	1	01	Dec 1898	110,000	G
54 Montana Ltd	Montana	660,000	3,300,000	5	05	Feb 1899	2,997,557	G, S
55 Montana Ore Purchasing	Montana	40,000	1,000,000	25	1 00	Jan 1899	880,000	G
56 Morning Star	California	2,400	240,000	100	4 00	Feb 1899	707,400	G
57 Mt. Rosa	Colorado	1,000,000	1,000,000	1	02	Jan 1898	60,000	G
58 Mercur	Utah	200,000	5,000,000	25	12 1/2	Jan 1899	1,284,000	G
59 Mammoth	Utah	400,000	10,000,000	25	05	Dec 1898	1,350,000	G, S, C, L
60 Matua	Colorado	1,000,000	1,000,000	1	02 1/2	Dec 1898	25,000	G
61 Mead	California	2,000,000	2,000,000	1	40	Dec 1898	80,000	G
62 Montreal	Colorado	1,000,000	1,000,000	1	01	Nov 1898	7,500	G
63 Monument	Colorado	300,000	300,000	1	01	Dec 1898	12,724	G
64 Moulton	Montana	400,000	2,000,000	5	05	Feb 1899	480,000	G
65 Moon Anchor Gold	Colorado	600,000	600,000	1	07 1/2	Nov 1898	261,000	G
66 Mountain Copper	California	250,000	6,250,000	25	82 1/2	Sept 1898	92,750	G
67 New York & Hon Rosario	Central A	150,000	1,500,000	10	10	Feb 1899	900,000	S, G
68 Napa	California	100,000	700,000	7	20	Jan 1899	90,000	G
69 New Idria Quicksilver	California	100,000	500,000	5	20	Jan 1899	10,000	G
70 North Star	California	200,000	2,000,000	10	25	Nov 1898	500,000	G
71 Ophir Hill	Utah	1,000	25,000	25	20 00	Dec 1898	20,000	G
72 Osceola	Michigan	50,000	1,250,000	25	2 00	Dec 1898	2,552,500	G
73 Parrot	Montana	230,000	2,300,000	10	30	Feb 1899	2,276,898	G
74 Pennsylvania Consolidated	California	51,500	5,150,000	10	05	Feb 1899	58,800	G
75 Pioneer	California	100,000	1,000,000	10	12 1/2	Dec 1898	50,000	G
76 Portland	Colorado	3,000,000	3,000,000	1	02	Feb 1899	2,250,080	G, S
77 Plumbago	California	300,000	300,000	1	15	Jan 1899	15,000	G
78 Quincy	Michigan	100,000	2,500,000	25	3 50	Feb 1899	10,470,000	G
79 Raven	Colorado	1,500,000	1,500,000	1	01	March 1898	20,000	G
80 Republic	Washington	1,000,000	1,000,000	1	03	April 1899	100,000	G
81 Sacramento	Utah	1,000,000	5,000,000	5	00 1/2	Feb 1899	67,000	G
82 Small Hopes Consolidated	Colorado	250,000	5,000,000	20	10	Feb 1899	3,325,000	S
83 South Swansea	Utah	150,000	150,000	1	05	Oct 1898	125,000	S, L
84 Standard	California	200,000	20,000,000	100	10	Aug 1898	5,674,940	G, S
85 St. Joseph	Missouri	30,000	3,000,000	10	1 50	Dec 1898	2,784,500	L
86 Silver King	Utah	150,000	3,000,000	20	25	April 1899	2,000,000	S, L, G
87 Smuggler	Colorado	1,000,000	1,000,000	1	01	Jan 1899	1,105,000	S, L, Z
88 Swansea	Utah	100,000	500,000	5	05	April 1899	150,000	S, L
89 Tamarack	Michigan	60,000	1,500,000	15	4 00	Dec 1898	5,500,000	G
90 Tanager	Colorado	200,000	2,000,000	10	25	Dec 1898	650,000	G
91 Utah	Utah	100,000	1,000,000	10	02	Jan 1899	179,000	G
92 Victor	Colorado	200,000	1,000,000	5	50	Dec 1898	1,150,000	G
93 Vindicator	Colorado	1,500,000	1,500,000	1	05	Jan 1899	180,000	G
94 War Eagle	British Col	2,000,000	1,000,000	1	01 1/2	Feb 1899	239,000	G
95 Wolverine	Michigan	60,000	2,500,000	25	1 00	Oct 1898	60,000	G
96 White Water	British Col	125,000	1,250,000	5	32	April 1898	194,000	G
97 Yellow Aster	California	100,000	1,000,000	10	10	Jan 1899	168,789	G

S. Silver; G. Gold; L. Lead; C. Copper; Q. Quicksilver; I. Iron; Z. Zinc.

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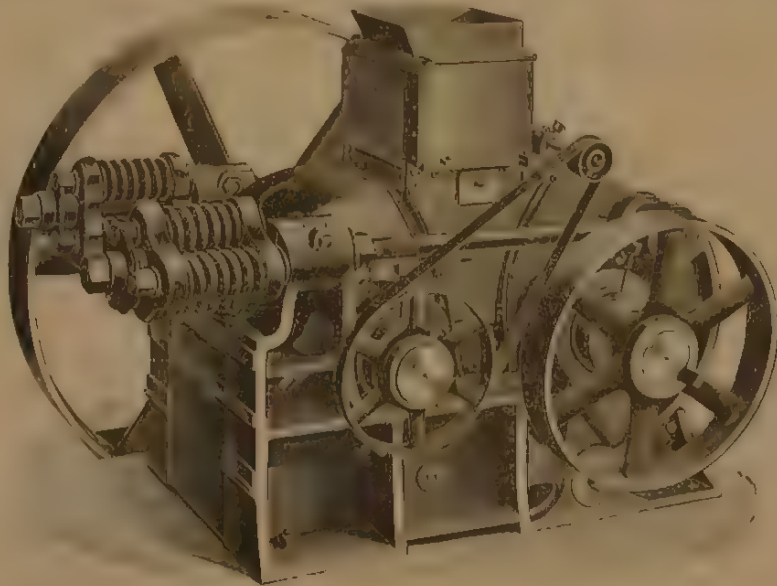


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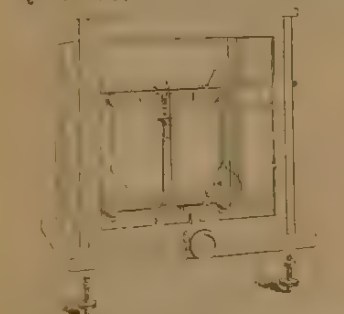
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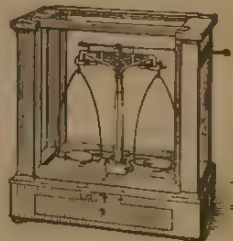
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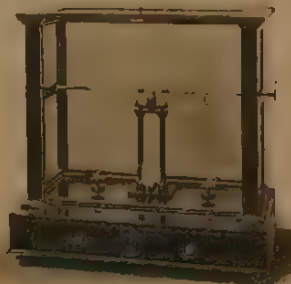
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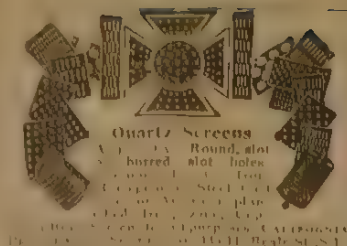
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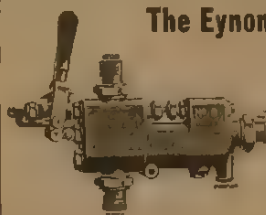
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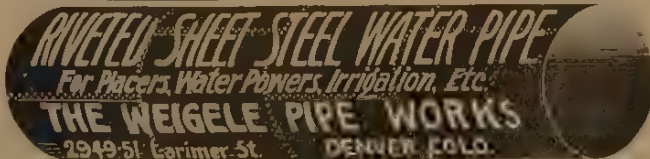
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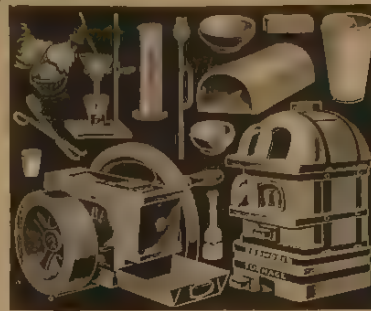
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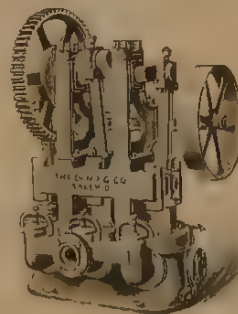
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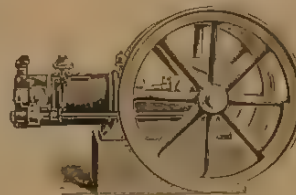
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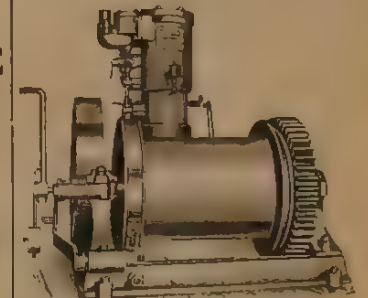
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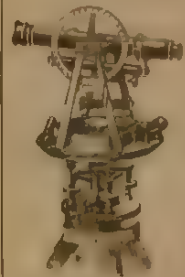
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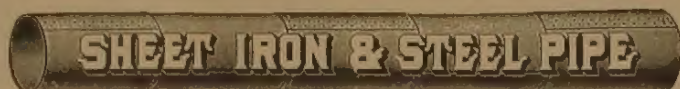
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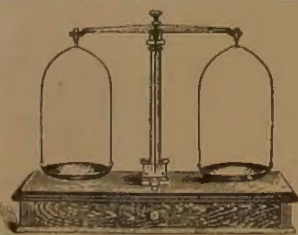
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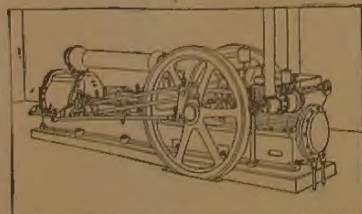
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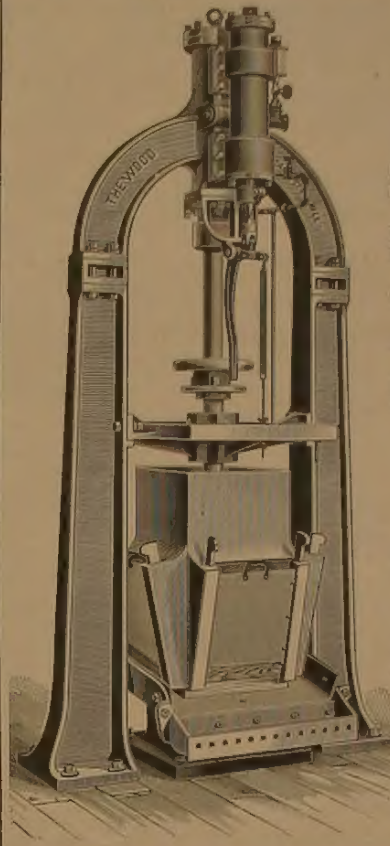
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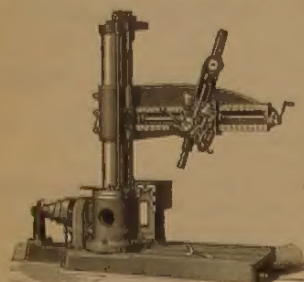
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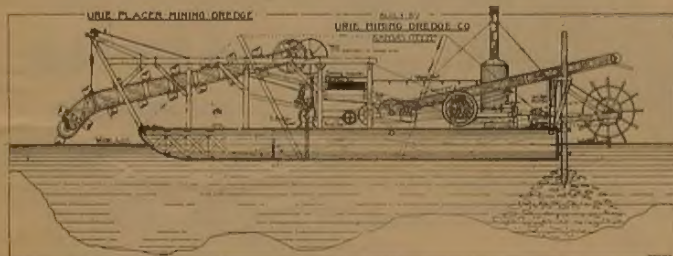
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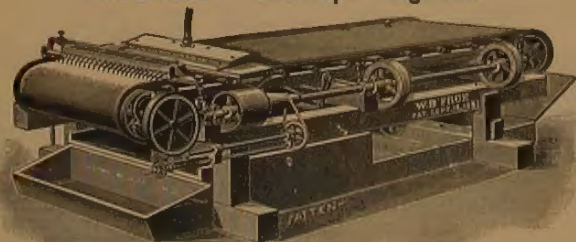
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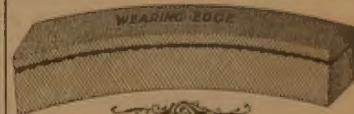
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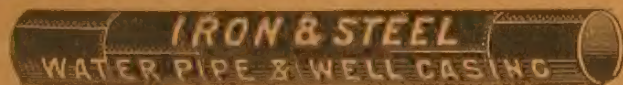
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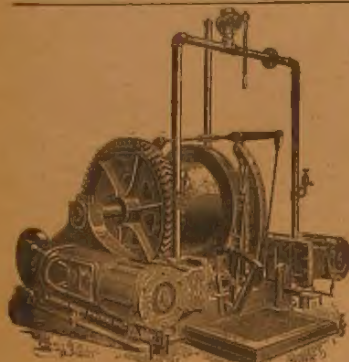
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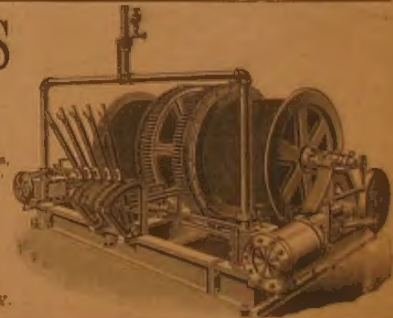
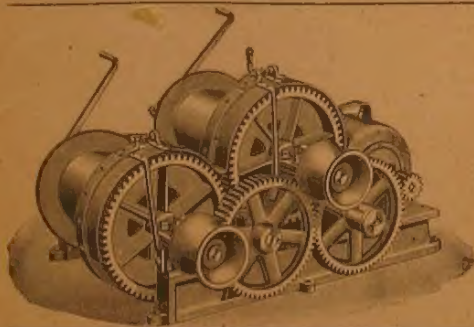
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